



# Transportation Concept Report

## Interstate 380

### District 4

June 2017



Disclaimer: The information and data contained in this Transportation Concept Report (TCR) is for Planning purposes only and should not be relied upon for final design of any project. Information in this report is subject to modification as conditions change and new information is obtained. Although information is dynamic and continually changing, District 4 Office of System and Regional Planning made every effort to ensure the accuracy and timeliness of the information contained in the TCR. The information in the TCR does not constitute a standard, specification, or regulation, nor is it intended to address design policies and procedures.

### California Department of Transportation

Mission Statement: Provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability

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## Stakeholder Acknowledgement:

District 4 is pleased to acknowledge the time and contributions of stakeholders and partner agencies to this Transportation Concept Report (TCR). Development of System Planning documents such as this one is dependent upon the participation and cooperation of key stakeholders. This TCR represents a cooperative Planning effort for Interstate 380 (I-380). Representatives of the City/County Association of Governments (C/CAG) of San Mateo County and the City of San Bruno provided essential information, advice and feedback for the preparation of this document.

This TCR will be posted on the Caltrans Corridor Mobility website at:  
<http://www.dot.ca.gov/dist4/systemplanning/>

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## ABOUT THE TRANSPORTATION CONCEPT REPORT

System Planning is the long-range Transportation Planning process for the California Department of Transportation (Caltrans). The System Planning process fulfills Caltrans statutory responsibility as owner/operator of the State Highway System (SHS) (Gov. Code §65086) by evaluating conditions and proposing enhancements to the SHS. Through System Planning, Caltrans focuses on developing an integrated multimodal transportation system that meets Caltrans Goals of Safety and Health, Stewardship and Efficiency, Sustainability, Livability and Economy, System Performance, and Organizational Excellence.

The System Planning process is primarily composed of three parts: the District System Management Plan (DSMP), the Transportation Concept Report (TCR), and the Corridor System Management Plan (CSMP). The DSMP is strategic policy and Planning document that focuses on maintaining, operating, managing, and developing the transportation system. The project list identify future projects. The TCR is a multi-jurisdictional document that identifies the existing and future route conditions as well as future needs for each route on the SHS. The CSMP is a more complex, multi-jurisdictional document that identifies future needs within freeway corridors primarily experiencing or expected to have high levels of congestion. The CSMP serves as a TCR for segments covered by the CSMP. The DSMP Project List is an inventory of planned and partially programmed transportation projects used to prioritize and recommend for funding. These System Planning products are also intended as resources for all stakeholders: the public, partner, regional, and local agencies.

### TCR Purpose

California's State Highway System needs long-range Planning documents to guide the logical development of transportation systems as required by law and as necessitated by the public, stakeholders, and system users. The purpose of the TCR is to evaluate current and projected conditions along the route and communicate the vision for the development of each route during a 20-25 year Planning horizon. The TCR is developed with the goals of increasing safety, improving mobility, providing excellent stewardship, and meeting community and environmental needs along the corridor through integrated management of the transportation network, including the highway, transit, pedestrian, bicycle, freight, operational improvements and travel demand management components of the corridor.

## STAKEHOLDER PARTICIPATION

Stakeholder participation was sought during the development of the Interstate 380 TCR. As the document was finalized, stakeholders were asked to review the document for accuracy and consistency with regard to existing plans, policies, and procedures. The process of including stakeholders adds value to the TCR by allowing for outside input and ideas to be reflected in the document and help strengthen public support.



## EXECUTIVE SUMMARY

### CONCEPT SUMMARY

Interstate 380 (I-380) is a 1.67 mile east–west freeway spur located west of the San Francisco Bay in northern San Mateo County. It connects I-280 in San Bruno to US Highway 101 (US 101) and the San Francisco International Airport (SFO). The freeway consists of three interchanges located at I-280, El Camino Real (State Route 82), and US 101. The route traverses office, commercial, and residential areas within the City of San Bruno and connects with SFO near the border of the City of South San Francisco.

I-380 is classified as a Federal Aid Interstate and is a designated Surface Transportation Assistance Act (STAA) route for larger trucks. To the east of the I-380/US 101 Interchange, I-380 connects to a distributor route near the Airport Maintenance Area.

The 25-year Concept for I-380 is based on current and projected operating conditions and acknowledges both programmed and planned transportation improvement projects along the route. The route concept reflects the State's goals to preserve and improve the transportation system and to meet California's climate change goals. The base year (reference year) and horizon year (evaluation year) for this TCR are 2015 and 2040, respectively.

*Table 1 — Corridor Concept Summary*

| SM-380<br>Post<br>Mile | Segment<br>Description          | Existing<br>Facility | 20-25 Year Concept  |
|------------------------|---------------------------------|----------------------|---|
| 4.70 to<br>6.37        | I-280 to Airport<br>Access Road | 7-8 GP               | 7-8 GP<br>ITS deployments such as planned ramp metering<br>Possible ramp reconfiguration at connectors to address congestion and<br>weaving issues as well as bicycle and pedestrian issues at the end<br>of the ramps on State Route 82 (El Camino Real) * |

GP= General Purpose, ITS=Intelligent Transportation Systems

\* Further study should include how these strategies will affect local circulation.

### CONCEPT RATIONALE

I-380 serves as vital link between I-280 and SFO for passengers, airport personnel, and air cargo. It also serves as a regional commuter route linking US 101 and I-280. The future concept maintains the route's existing capacity and function, while introducing operational improvements such as ramp metering to optimize system performance, and possible ramp reconfiguration at connectors. Strategies for transit and other modes of Active Transportation have been proposed to achieve mobility efficiency and meet long-term mobility needs and the statewide goal of reducing greenhouse gas (GHG) emissions.

Table 2 — Proposed Projects and Strategies

| Highway Concept   |
|---|
| <p>The planned concept for I-380 focuses on Transportation System Management and Operations (TSMO), including Intelligent Transportation Systems (ITS), and strategies to minimize weaving and merging conflicts at the junctions with I-280 and US 101. It is the State’s goal to manage its existing system through various system management strategies:</p> <ul style="list-style-type: none"> <li>• Minimize weaving and merging conflicts, as feasible, through ramp reconfiguration at the connectors.</li> <li>• Prioritize pavement preservation and highway maintenance on I-380.</li> <li>• Implement ITS along the Corridor, include and monitor planned ramp metering at junctions with US 101, SR 82, I-280, Access Road, and Airport Boulevard within ten years of 2015.</li> <li>• Complete the San Mateo County SMART Corridors Project (more information on page 25).</li> <li>• Improve local access at I-280/I-380 from Sneath Lane to San Bruno Avenue to I-380.</li> </ul>  |
| Multimodal Strategies   |
| <p>Transit, bicycle, and pedestrian strategies are aimed at integrating and enhancing networks along and across the I-380 Corridor. The following multimodal strategies should be prioritized when applicable, with attention to improve pedestrian/bicyclist access at freeway ramp crossings at the I-380 junction with State Route 82 (El Camino Real).</p> <p><b>Transit</b></p> <ul style="list-style-type: none"> <li>• Support operational improvements and expansion of transit service. Work with transit operators, such as Samtrans, on planning and implementation of projects that increase people throughput in the Corridor, for example, HOV bypass lanes and bus signal priority at El Camino Real on-ramps, and improvements to amenities such as transit stops at Huntington Avenue.</li> </ul> <p><b>Bicycle</b></p> <ul style="list-style-type: none"> <li>• Encourage/Incorporate bicycle facility design treatments (bike lanes or wider shoulders, ramp reconstruction to intersect at a 90-degree angle, bike lane striping to the left of right-turn-only lane, avoidance of dual right-turn lanes) into interchange reconfiguration/reconstruction at El Camino Real. Conceptual designs from the Plan are included in Appendix C of this report.</li> <li>• Review and evaluate maintenance projects for the feasibility of incorporating striping and signage improvements to enhance bicycle access and safety at ramp intersections with local roads such as I-380/El Camino Real and I-380/I-280/San Bruno Avenue West.<sup>1</sup></li> </ul> <p><b>Pedestrian</b></p> <ul style="list-style-type: none"> <li>• Remove barriers to pedestrian circulation by squaring up ramp intersections (e.g. El Camino Real) to slow turning vehicles and shorten crossing distances, and by striping crosswalks at on and off-ramps along ramp termini to direct pedestrians and notify motorists of their presence, and by adding countdown signals.</li> <li>• Review and evaluate future interchange configuration/reconstruction projects with regard to the need to provide and connect sidewalks around ramp intersections (e.g. El Camino Real), based on pedestrian demand including current and planned land use. Analyze lane width of facility to consider addition of medians to provide a pedestrian refuge and calm traffic.</li> <li>• Work with local agencies on implementing planned and programmed pedestrian and bicycle network improvements. Strategies from San Bruno’s Walk and Bike Plan include increasing the visibility of pedestrians and reducing conflicts with drivers, adding high-visibility pedestrian crosswalk markings, rectangular rapid flashing beacons, yield lines and warning signs, and relocating a curb ramp at El Camino Real intersection.</li> </ul> |

<sup>1</sup> This ramp is officially part of I-280, however, the ramp crossing is located on an important bike route that traverses the length of the I-380 corridor, connecting neighborhoods and natural areas west of I-280 with Downtown San Bruno, SFO and the Bay Trail.

## CORRIDOR OVERVIEW



Image: Google Earth

### ROUTE DESCRIPTION

I-380 is located on the Peninsula, in northern San Mateo County, west of the San Francisco Bay. I-380 begins at the I-280/I-380 Interchange in the City of San Bruno and continues east, crossing SR 82 (El Camino Real). As it nears the eastern shore of the San Francisco Bay, the route crosses US 101 at SFO and terminates at North Access Road, north side of the airport. At its eastern terminus, I-380 briefly passes through the City of South San Francisco and an unincorporated area of San Mateo County.

As a spur to I-80, I-380 is part of the Interstate National Highway System. I-380 provides a direct freeway link between US 101 and I-280, and serves to move traffic between the two corridors. Along with US 101 and I-280, I-380 is a designated Surface Transportation Assistance Act (STAA) route. It is an important transportation link for both passengers and air cargo accessing SFO as well as regional commuters traveling between the two freeways. I-380 also serves as a connection for US 101 travelers seeking access to the western side of San Francisco via I-280. I-380 is the only direct access freeway facility north of SR 92 linking US 101 and I-280.

I-380 has three junctions with State highways: I-280, US 101, and SR 82. Traversing through flat, urban terrain, the route provides access to SFO, California's second largest commercial service airport, as well as access to regional employment in San Francisco and the Silicon Valley. The route also provides access to regional shopping destinations along El Camino Real and at the Tanforan Mall in San Bruno. I-380 is a divided highway with seven to eight freeway lanes. The highway is bridged at several junctions, allowing multimodal movement along the local surface streets below, as shown on Figure 1. Figure 1 also shows the I-380 Corridor and its post miles, and Table 3 lists the Corridor's route designations and characteristics.

**Figure 1 — I-380 Corridor Map with Postmiles**

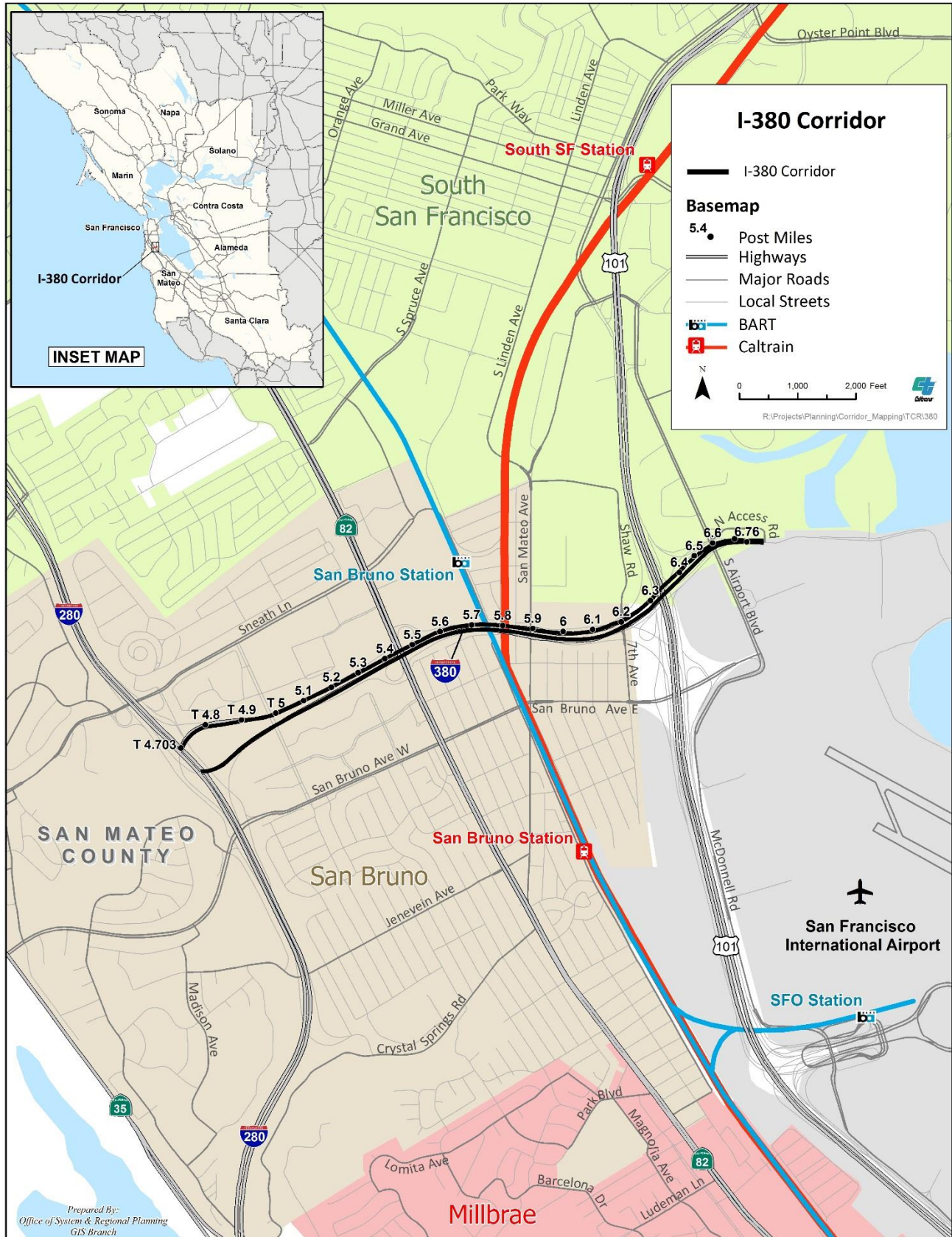


Table 3 — Route Designations and Characteristics

|  |   |
|--|---|
| <b>Freeway &amp; Expressway (F&amp;E)</b>      | Yes   |
| <b>National Highway System (NHS)</b>           | Yes   |
| <b>Strategic Highway Network (STRAHNET)</b>    | Yes   |
| <b>Scenic Highway</b>                          | No  |
| <b>Interregional Road System (IRRS)</b>        | Yes   |
| <b>High Emphasis</b>                           | No  |
| <b>Focus Route</b>                             | No  |
| <b>Federal Functional Classification</b>       | Interstate  |
| <b>Goods Movement Route</b>                    | Yes   |
| <b>Truck Designation</b>                       | Surface Transportation Assistance Act (STAA)<br>and National Highway Freight Network (NHFN)   |
| <b>Rural/Urban/Urbanized</b>                   | Urban   |
| <b>Metropolitan Planning Organization</b>      | Metropolitan Transportation Commission (MTC)  |
| <b>Regional Transportation Planning Agency</b> | Association of Bay Area Governments (ABAG)  |
| <b>Congestion Management Agency</b>            | City/County Association of Governments of<br>San Mateo (CCAG)   |
| <b>County Transportation Commission</b>        | San Mateo County Transit District (SamTrans)/<br>San Mateo County Transportation Authority<br>(SMCTA)   |
| <b>Local Agencies</b>                          | San Mateo County, Cities of San Bruno and<br>South San Francisco, and areas of<br>Unincorporated South San Francisco at SFO<br>(owned by the County of San Francisco) |
| <b>Air District</b>                            | Bay Area Air Quality Management District  |
| <b>Terrain</b>                                 | Flat, grade less than 3%  |

## COMMUNITY CHARACTERISTICS

San Mateo County is largely suburban and has an estimated population of 765,135 (2015). San Mateo County is home to several corporate campuses, and is located between major employment centers in San Francisco and Santa Clara Counties. The County has been experiencing accelerated population growth since recovering from the Great Recession of 2008.<sup>2</sup> Approximately 59 percent of County residents live and work within San Mateo County; the remaining residents work primarily in neighboring San Francisco and Santa Clara Counties.<sup>3</sup>

With the exception of a small segment that merges with US 101 as it enters SFO in South San Francisco, I-380 is located within the City of San Bruno. Totalling an area of 5.5 square miles, the City of San Bruno spreads from the lowlands of the San Francisco Bay into the foothills of the Santa Cruz Mountains. It is generally a working class community of approximately 43,000 residents, with a racial makeup that is predominantly White (49.5 percent), followed by Hispanic or Latino (29.2 percent), Asian (25.4 percent), and African American (2.3 percent).<sup>4</sup> From 2014 to 2015, the population grew at a rate of 2.69 percent.<sup>5</sup> The City is primarily residential, with mostly single family homes. According to the US Census Population and Housing Estimates, the median household income for San Bruno was \$83,888 in 2015, roughly ten percent less than the County average. The median home value was \$602,300 and the median rent was \$1,685. Similar to the County average, single occupancy drivers make up 70.8 percent of San Bruno's commuters, while 13 percent carpool, 10.6 percent use public transportation and 1.8 percent walk to work.<sup>6</sup>

The local economy has experienced moderate, continued growth. The top three industries in San Bruno are trade, tourism, and transportation. SFO is a major regional destination. In 2014, the airport handled 47 million air passengers or 70.9 percent of the Bay Area commercial airport (passenger) market share<sup>7</sup> and captured 55 percent of the Bay Area air cargo market, including about 95 percent of the international market (2012).<sup>8</sup> SFO contributes over \$400 million in tax revenue to San Mateo County.<sup>8</sup>

San Bruno's retail commercial land uses are located along I-380, SR 82 and US 101. In addition to SFO, regional traffic generators include YouTube Headquarters, Bayhill Office Center and the Tanforan Mall, all of which are located along the I-380 Corridor. YouTube, a division of Google, is San Bruno's largest private employer with 1,300 employees. YouTube recently purchased the 554,000 square foot Bayhill Office Center, with plans to expand its operations, potentially hiring up to 2,800 employees.<sup>9</sup> Current Bayhill tenants include Oracle and Walmart Labs. In addition to serving San Bruno's industry, I-380 is an important regional transportation link between I-280 and US 101.

San Bruno's Downtown District is located east of SR-82 and south of I-380, extending towards the City of Millbrae. The District is home to the Bay Area Rapid Transit (BART) San Bruno Station and the San Bruno Caltrain Station, which makes it an ideal location for Transit Oriented Development (TOD).

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<sup>2</sup> <http://siliconvalleyindicators.org/pdf/population-brief-2015-05.pdf> (Last Accessed 10/24/2016).

<sup>3</sup> Plan Bay Area 2040, County Profiles, 2013.

<sup>4</sup> U.S. Census, Population and Housing Estimates, 2014.

<sup>5</sup> <http://siliconvalleyindicators.org/pdf/population-brief-2015-05.pdf> (Last Accessed 10/24/2016).

<sup>6</sup> U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates (2015).

<sup>7</sup> SFO Facts: <http://media.flysfo.com/sfo-facts-2014.pdf> (Last Accessed 2/23/2016).

<sup>8</sup> Caltrans Freight Planning Regional Summary, SFO (2014):

[http://dot.ca.gov/hq/tpp/offices/ogm/CFMP/Fact\\_Sheets/Regional/SFBayAreaRegSummary\\_031714.pdf](http://dot.ca.gov/hq/tpp/offices/ogm/CFMP/Fact_Sheets/Regional/SFBayAreaRegSummary_031714.pdf)

<sup>9</sup> Silicon Valley Business Report, <http://www.bizjournals.com/sanjose/news/2016/01/19/youtube-grabs-550-000-sf-in-giant-san-bruno.html?page=all> (Last Accessed 10/24/2016).

## LAND USE

I-380 runs along the edge of the City of South San Francisco near the San Francisco Bay, connecting SFO and US 101 with the City of San Bruno. Located just six miles south of the City of San Francisco, the Corridor passes largely through the northeastern quadrant of San Bruno, a mix of housing, office and commercial retail uses. The majority of San Bruno's land area consists of residential use. The City's older, eastern half contains the greatest diversity of land uses, including mixed-density residences. Streets are organized in a grid pattern. Commercial uses are concentrated along El Camino Real (SR 82), San Mateo Avenue (south of I-380), and San Bruno Avenue (east of Cherry Avenue), and within two regional shopping centers of approximately 72 acres. The Bayhill Office Park, immediately south of I-380, is the City's largest employment center (approximately 73 acres). Several large open space areas such as Sweeney Ridge (part of the Golden Gate National Recreation Area), Crestmoor Canyon, Junipero Serra Park, and San Andreas Lake are located to the west of the Corridor. See Figure 2 for major land uses around the I-380 Corridor.



A view of San Bruno, SFO, and the San Francisco Bay taken from Crestmoor Drive, San Bruno.<sup>10</sup>

## PRIORITY DEVELOPMENT AREAS AND TRANSIT CORRIDORS IN SAN BRUNO

Downtown San Bruno is served by BART and Caltrain commuter rail, and is identified as a Priority Development Area (PDA) within the Regional Transportation Plan (RTP) known as Plan Bay Area (2013). Downtown San Bruno is part of a larger PDA corridor that includes El Camino Real and Grand Boulevard.<sup>11</sup> See Figure 2 for more information.

Mapped in Figure 3, the *San Bruno Downtown and Transit Corridors Plan*<sup>12</sup> designates future transit oriented infill development within an area surrounding the I-380 Corridor, concentrated along El Camino Real, Huntington, San Bruno, and San Mateo Avenues. To encourage infill development, San Bruno's Measure N (2014) increased the permitted residential density on 42 parcels from the current 320 housing units to 1,930, allowing for a maximum of 1,610 new units.<sup>13</sup> The Measure calls for higher density development, emphasizing a mix of residential and commercial uses that will promote walkability, transit use, and economic development. Several developments have been completed.

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<sup>10</sup> Courtesy of Thiago Souza: <http://www.panoramio.com/photo/483887> (Last Accessed 12/2016).

<sup>11</sup> Plan Bay Area, Priority Development Showcase: <http://gis.abag.ca.gov/website/PDAShowcase/> (Last Accessed 3/24/2016).

<sup>12</sup> San Bruno Downtown & Transit Corridors Plan: <http://www.grandboulevard.net/community/index.php/activity/177-san-bruno-downtown-and-transit-corridors-plan> (Last Accessed 3/24/2016).

<sup>13</sup> Measure N Transit Corridors Plan, City of San Bruno: <https://www.shapethefuture.org/elections/2014/november/documents/measure/SanBrunoMeasureResolutionFullText.pdf> (Last Accessed 3/24/2016).

Figure 2 — Land Use Map

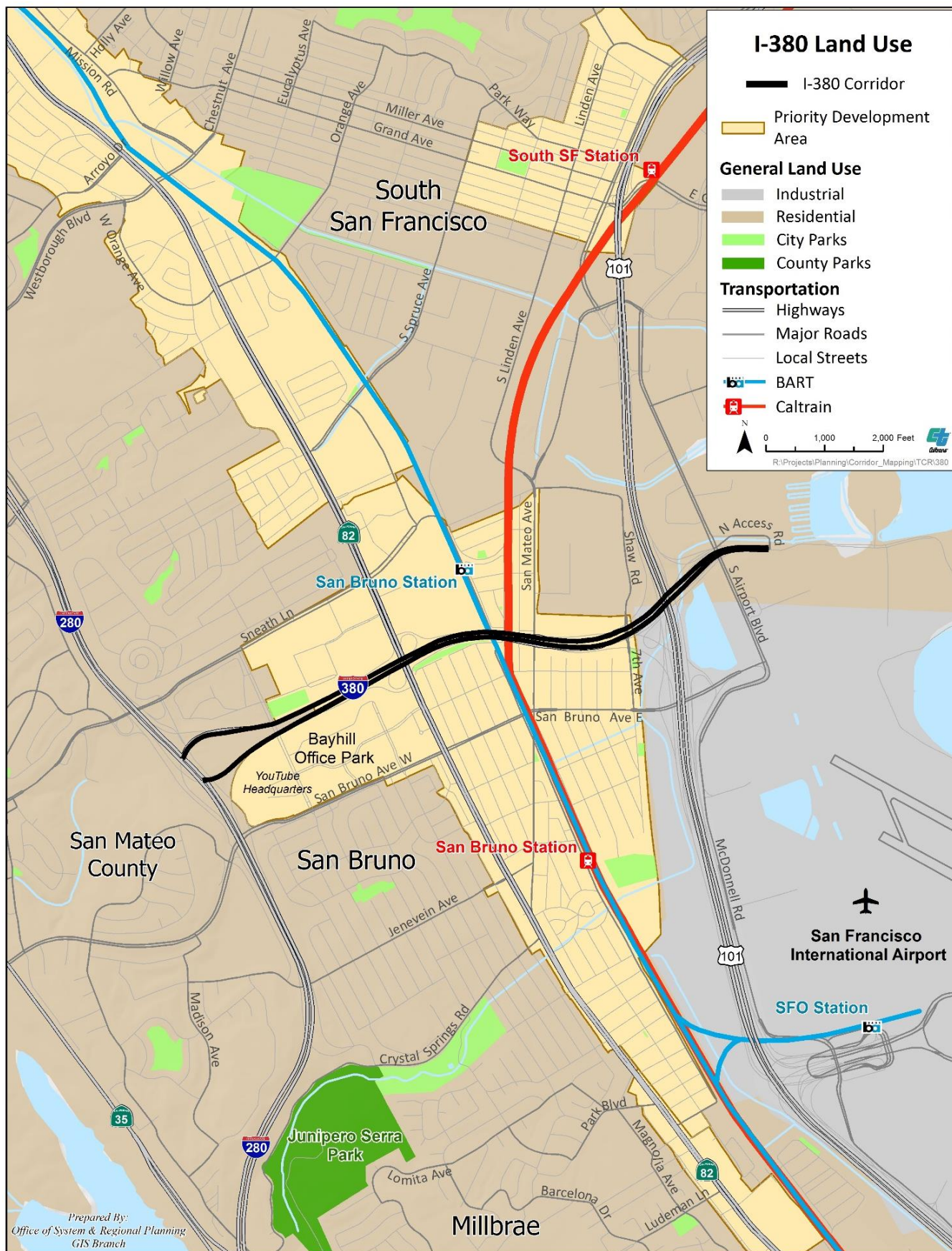


Figure 3 — San Bruno Downtown and Transit Corridors Map

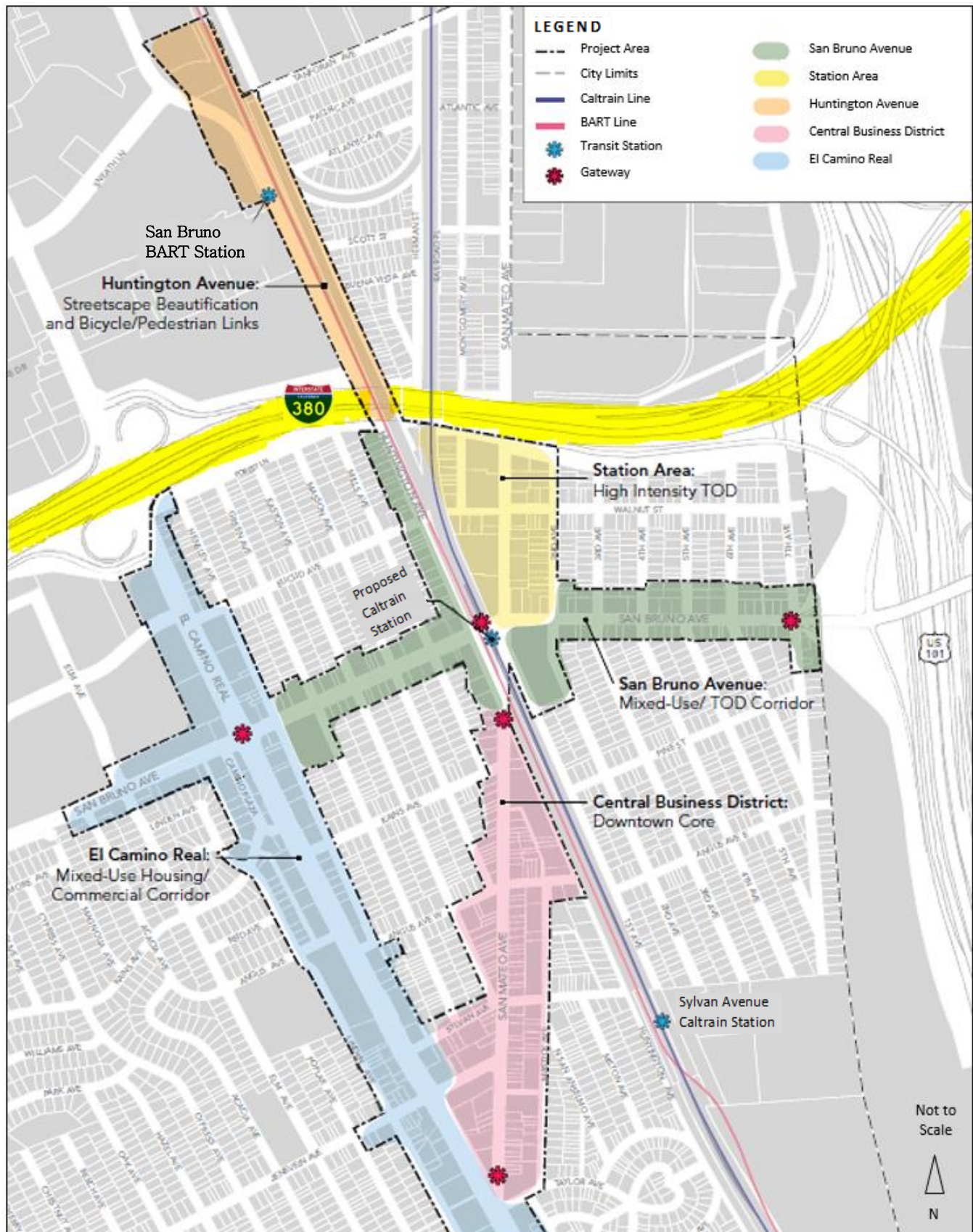


Image: MIG Consultants, for the City of San Bruno Transit Corridors Specific Plan (2013)

## SMART MOBILITY FRAMEWORK

In response to Assembly Bill 32 (the California Global Warming Solutions Act of 2006)<sup>14</sup> and Senate Bill 375 (the Sustainable Communities and Climate Protection Act of 2008),<sup>15</sup> Caltrans introduced *Smart Mobility* to its Transportation Planning process and established the Smart Mobility Framework (SMF) in 2010.<sup>16</sup> Smart Mobility is a Planning tool that promotes convenient, accessible and safe multi-modal travel of people and freight as well as efficient use of land use, in order to enhance California's economic, environmental and human resources. The SMF is built on six principles: Location Efficiency, Reliable Mobility, Health and Safety, Environmental Stewardship, Social Equity, and Robust Economy. The Location Efficiency principle identifies place types wherein implementation of specific transportation investments, along with planning and management strategies, will help improve location efficiency and achieve Smart Mobility benefits, including reduced Vehicle Miles Traveled (VMT) and Greenhouse Gas (GHG) emissions. Location efficient design supports convenient, non-motorized travel, and efficient vehicle trips at the neighborhood and area scale, and combines land use with a multi-modal transportation system to make destinations available through transit and High Occupant Vehicle (HOV) travel, and efficient vehicle trips at the regional scale.

Table 4 identifies Place Types that characterize the I-380 Corridor (Corridor) area, and endorses place-specific Smart Mobility transportation strategies. Regional economic trends and development priorities suggest growth will occur along the Corridor, but roadway capacity increasing projects are not necessary. As local agencies guide development near existing transit and downtown areas, location efficiency will be improved. Compatible transportation infrastructure will support the transition toward less auto-dependent communities and improve accessibility for all people.

*Table 4 — Smart Mobility Strategies by Place Type*

| Place Type                             | Strategy  |
|--|---|
| Urbanized:<br>Suburban<br>Neighborhood | <ul style="list-style-type: none"><li>• Support the implementation Complete Streets<sup>17</sup> on local parallel streets</li><li>• Improve multi-modal system by providing continuous sidewalks, safe pedestrian crossings and an extensive bike network</li><li>• Provide accessible transit stations and reliable, interconnected transit</li></ul>   |
| Urbanized:<br>Industrial/Special Use   | <ul style="list-style-type: none"><li>• Provide reliable transit options</li><li>• Consider Transportation Demand Management Programs for major trip generators; these may include bike share, car share, and effective commuter and transit incentives</li><li>• Consider operational strategies such as ramp metering during peak hours, for example at interchanges with I-280, US 101, and SR 82.</li></ul> |
| Protected Lands                        | <ul style="list-style-type: none"><li>• Improve access to recreational facilities via bicycle infrastructure</li></ul>  |

<sup>14</sup> AB 32 (2006): <http://www.arb.ca.gov/cc/ab32/ab32.htm>

<sup>15</sup> SB 375 (2008): <http://www.arb.ca.gov/cc/sb375/sb375.htm>

<sup>16</sup> Smart Mobility 2010: A Call to Action for the New Decade, Caltrans, 2010.

<sup>17</sup> Caltrans Complete Streets Implementation Action Plan 2.0, 2014: [http://www.dot.ca.gov/hq/tpp/offices/ocp/docs/CSIAP2\\_rpt.pdf](http://www.dot.ca.gov/hq/tpp/offices/ocp/docs/CSIAP2_rpt.pdf)

## SYSTEM CHARACTERISTICS

I-380 runs east to west connecting with the I-280 and US 101 Corridors. The route intersects with US 101 to provide access to SFO. Travelling 1.67 miles between I-280 and US 101, I-380 has seven to eight mixed-flow lanes. East of US 101, I-380 continues 0.37 miles as a freeway ramp that narrows down to two lanes in each direction and terminates at North Access Road by the United Airlines Maintenance Facility. Table 5 lists I-380 designations and characteristics.

The route was originally intended to extend west through San Bruno to Skyline Boulevard (State Route 35), and continue over Sweeney Ridge towards the coast, connecting with State Route 1 in the City of Pacifica. Due to the route's passing over the San Andreas Fault and opposition from members of the local community, the segment was rescinded in 1979.

*Table 5 — Route Designations and Characteristics*

| Existing Facility             |   |
|-------------------------------|---|
| Facility Type                 | Freeway   |
| General Purpose Lanes         | 7-8   |
| Lane Miles                    | 11.55   |
| Centerline Miles              | 1.67  |
| Median Width                  | 30' – 99'+  |
| Median Characteristics        | Paved and Separate Grades/Structures  |
| Auxiliary Lanes               | 0   |
| Distressed Pavement           | Minor Distress and Bad Ride Only as of 2016   |
| Current ROW                   | 200' +  |
| TMS Elements (Base Year 2016) | Closed Circuit Television Cameras (CCTV), Highway Advisory Radio (HAR), and Extinguishable Message Signs for HAR* |

\*There is one operational freeway ramp meter, which serves as a connector flyover from I-380 to northbound US 101.

## PAVEMENT CONDITIONS

Based on Caltrans assessment of State Highway System pavement conditions, I-380 pavement is classified as “bad ride only” and “minor pavement distress” as of 2016. These conditions require preventative maintenance treatments or minor rehabilitation to address minor cracking or slab cracking. I-380 is not included in the 2016 Ten-Year SHOPP Pavement Management Plan.<sup>18</sup> The following map shows I-380 pavement conditions:

**Figure 4 — I-380 Pavement Conditions.**<sup>19</sup>



<sup>18</sup> Ten-Year SHOPP Pavement Plan, Caltrans District 4, Division of Maintenance: [http://sv04maint/shopp/3pavemt\\_mgmt.htm](http://sv04maint/shopp/3pavemt_mgmt.htm) (Last Update 2/2016).

<sup>19</sup> Map prepared by District 4, Office of Regional Planning, GIS Branch (2016).

## BICYCLE FACILITIES

In the Bay Area, the modal share of bicycle trips compared to other modes is relatively small and varies greatly across communities. According to the US Census (2015) American Community Survey estimates, the bicycling commute share in San Bruno (0.3 percent) is lower than the County's (1.3 percent), the State's (1.1 percent), and the national bike (commute) mode share (0.6 percent).<sup>20</sup>

Bicyclists are prohibited on I-380 and local surface streets provide bicycle access throughout the I-380 Corridor. These existing bike facilities are shown in Figure 5. Surface streets crossing under I-380 consist of Class III designated bike routes that share lanes with vehicles and are signed, but do not have bicycle lane markings on the pavement. Located north of the I-380 Corridor, Sneath Lane is one of three Class II bike lane facilities within the City of San Bruno. Initiating near I-280/I-380, the bike lanes on Sneath run east-west ultimately connecting to airport-accessible San Bruno Avenue as well as with the Bay Trail along a Class I bike path. At SFO, dedicated Class II bike lanes provide access to SFO terminals, enabling passengers and employees to bike to, from and around the airport. SFO offers five short-term and long-term bicycle parking areas. Currently, no Class I bike paths or Class IV separated bikeways exist within the I-380 Corridor area.

Class III bike routes are shared facilities, sometimes marked with "sharrows," which help acknowledge bicyclists and alert drivers of their presence on roads, but there is no evidence that Class III facilities improve ridership rates or make roads safer.<sup>21</sup> By contrast, evidence does suggest that Class IV separated bike lanes result in safer roads and increased bicycle ridership rates, without negative impacts to vehicle throughput.<sup>22</sup> Understanding the needs of the various types of bicyclists is an important part of planning for improvements. While bicyclists' skills and confidence can vary significantly, safety concerns are paramount for all bicyclists. One percent of bicyclists are comfortable riding anywhere they are legally allowed, including space shared with cars and trucks along arterials or rural highways. Meanwhile, seven percent of bicyclists just need a bike lane or shoulder for any traffic conditions. However, the majority of bicyclists are typically more comfortable on roadways that provide space separated from motorists and/or along separated pathways, especially if motorized traffic speed or volume is high.<sup>23</sup> As illustrated in various communities throughout California, developing a safe, direct, and connected bicycle network will enhance mobility across the Corridor and help to increase the number of people using this mode of transportation.

To address network deficiencies, the City of San Bruno adopted the Walk 'n Bike Plan in 2016.<sup>24</sup> The Plan seeks to develop a 23-mile long bike network consisting of a combination of bike lanes, bike routes, and separated bikeways. A map of the bike plan is included in Appendix C of this report. The plan proposes an east-west bikeway that would parallel I-380 on the south, and the addition of north-south lanes along Huntington Avenue, San Mateo Avenue, and immediately west of El Camino Real along Elm and Linden Avenues. While the corridor concept promotes a complete bicycle network, these north-south routes are particularly important since they support access to transit stations and retail corridors along El Camino Real and San Mateo Avenue. The Plan also discusses bicycle and pedestrian conflicts at the I-380/SR 82 (El Camino Real) Interchange and proposes short and long-range improvements at the uncontrolled pedestrian crossing freeway loop ramps.

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<sup>20</sup> U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates: Commuting Characteristics

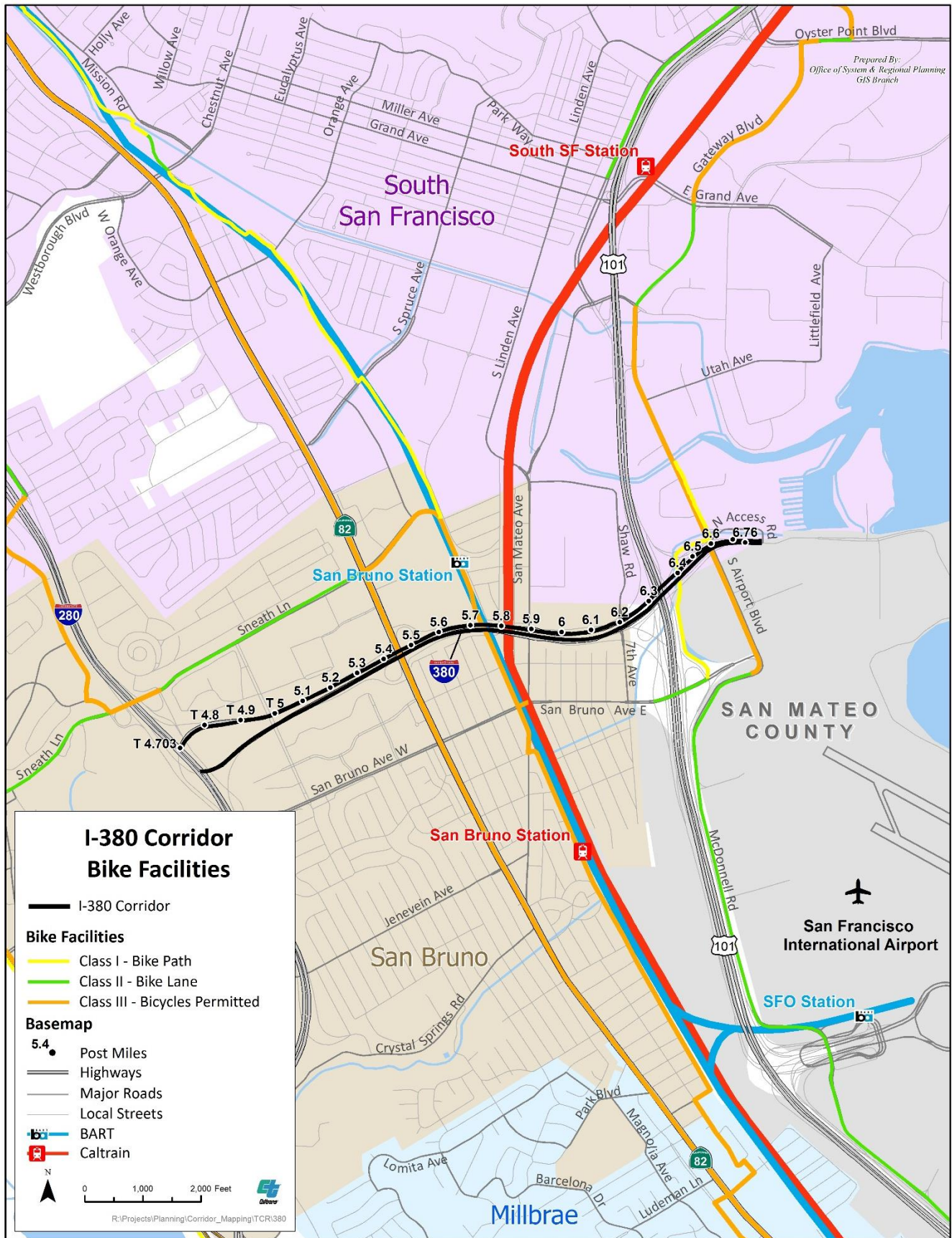
<sup>21</sup> TRB 2016 Annual Meeting, Nicholas N. Ferenchak & Wesley E. Marshall, PhD, PE, "The Relative (In)Effectiveness of Bicycle Sharrows on Ridership and Safety Outcomes," August, 2015: <http://www.historicalcolumbia.com/SharrowStudy.pdf> (Last assessed 4/2016).

<sup>22</sup> Protected Bike Lanes in NYC, New York City DOT, 2014: <http://www.nyc.gov/html/dot/downloads/pdf/2014-09-03-bicycle-path-data-analysis.pdf> (Last accessed 4/2016)

<sup>23</sup> Four Types of Transportation Cyclists, as classified by Roger Geller, Portland Office of Transportation, Undated.

<sup>24</sup> The City of San Bruno Walk 'N Bike Plan (2016): <https://sanbruno.ca.gov/civicax/filebank/blobdload.aspx?blobid=27455>

Figure 5 — Bicycle Facilities within the I-380 Corridor Area






## PEDESTRIAN FACILITIES

Pedestrian access is prohibited on I-380. The highway is elevated at several locations, which allows for lateral movement on the local streets below. Shown in Table 6, there are three interchanges along I-380. The interchange with SR 82, the conventional highway El Camino Real, intersects the pedestrian realm. At this interchange, sidewalks and non-signalized pedestrian crossings are provided at each of the on and off-ramps. SR 82 is within a high pedestrian demand area<sup>25</sup> and is a focal point for sidewalks, walking pathways and crossing improvements. The area is characteristically suburban and the land use patterns favor automobile movement. According to the US Census (2015) estimates, the pedestrian commute share in San Bruno (2.5 percent), is the same as the county's, and slightly lower than the State (2.7 percent) and national pedestrian mode share (2.8 percent) estimates.<sup>26</sup>

Freeway interchanges and ramps are some of the most challenging locations for pedestrians and cyclists, as they are designed to accommodate high traffic speeds for drivers exiting or entering freeways. San Bruno's Walk 'n Bike Plan (2016) discusses bicycle and pedestrian conflicts at the I-380/SR 82 (El Camino Real) Interchange and proposes short and long-range improvements at the uncontrolled pedestrian crossing freeway loop ramps. Near-term improvements include installing pedestrian crossing warning signs including rectangular rapid flashing beacons (RRFBs), high visibility crosswalk markings, yield lines, lighting and realigned curb ramps. Long-term improvements include squaring-up the alignment of the loop on-ramps to lower the speed of approaching traffic and to shorten the distance for pedestrians across the ramp. These strategies will improve visibility and adequately warn drivers of pedestrian and bicycle movements. Conceptual designs from the Plan are included in Appendix C of this report.

Table 6 — Pedestrian Facilities by Post Mile Segment

| Post Mile    | Location Description*   | Pedestrian Crossing | Facility         | Sidewalk Present | Facility Description  |
|--------------|---|---------------------|------------------|------------------|---|
| 0.00 to 0.23 |  | Prohibited          | San Bruno Avenue | Yes              | Grade separated, partially marked and signalized crossings with medians at freeway ramps                          |
|              |   |                     | Sneath Lane      | Yes              | Grade separated, signalized at freeway ramps, bike accessible at the end of the ramp                              |
| 0.23 to 1.50 |  | Underpass           | SR 82            | Yes              | Grade separated, short distance on/off ramp crossings with 3 of 4 crossings not signalized at the end of the ramp |
| 1.50 to 5.65 |  | Prohibited          | San Bruno Avenue | Yes              | Grade separated, signalized, bike accessible across US 101 at the junction  |

\* Table 6, Images: Google Map

<sup>25</sup>A demand analysis based on land use, proximity to transit, employment and residential densities, intersection density, street connectivity, demographics, and other factors predicts that pedestrian activity is most concentrated along the Highway 101 Corridor (including El Camino Real) in the eastern part of the County. The pedestrian demand analysis informs the development of focused areas for pedestrian improvements. San Mateo County Comprehensive Bicycle and Pedestrian Plan, 2011.

[http://ccag.ca.gov/wp-content/uploads/2014/07/CBPP\\_Main-Report\\_Sept2011\\_FINAL.pdf](http://ccag.ca.gov/wp-content/uploads/2014/07/CBPP_Main-Report_Sept2011_FINAL.pdf) (Last Assessed 10/2016).

<sup>26</sup> U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates: Commuting Characteristics

## TRANSIT FACILITIES

Almost twelve percent of San Bruno residents commute to work by transit.<sup>27</sup> This higher-than-average figure for San Mateo County (9.4 percent) is attributed to the accessibility and quality of transit options within the Corridor. San Bruno is served by two regional rail stations and a countywide bus system. Transit ridership will likely increase as new developments are prioritized along the commuter rail corridor. Providing last mile service connections is vital to increasing the transit mode share.

*Table 7 — Transit Facilities within the I-380 Corridor*

| Mode & Collateral Facility                          | Name                 | Route End Points   | Daily Ridership  | Headway | Operating Period                | ITS & Technology                    | Stations                                 |                 | Amenities                     | Bikes Allowed on Transit | Location Description                         | # Parking Spaces |
|---|----------------------|--|------------------|---------|---------------------------------|-------------------------------------|--|-----------------|-------------------------------|--------------------------|--|------------------|
|   |                      |  |                  |         |                                 |                                     | Jurisdiction                             | Post Miles      |                               |                          |  |                  |
| Heavy Rail  | BART                 | Millbrae to Richmond/<br>Pittsburg/<br>Freemont/<br>Dublin | 39,100<br>(2014) | Short   | Daily<br>4 – 12<br>am           | Exclusive<br>Guideway,<br>Real Time | San<br>Bruno,<br>S. San<br>Francisc<br>o | Near<br>380_5.6 | 30 Bike<br>Lockers<br>Racks   | Yes                      | San Bruno<br>and SFO<br>BART<br>Stations     | N/A              |
| Heavy Rail<br>Shared with<br>Southern<br>Pacific RR | Caltrain             | San<br>Francisco<br>to Gilroy                              | 58,429<br>(2015) | Short   | Daily<br>4 – 12<br>am           | Exclusive<br>Guideway,<br>Real Time | San<br>Bruno                             | Near<br>380_5.8 | 40 Bike<br>Lockers<br>7 Racks | Yes                      | San Bruno<br>Caltrain<br>Station             | 201              |
| Bus   | SamTrans<br>Route 38 | Colma to<br>S. San<br>Francisco                            | 42,028<br>(2015) | Long    | Daily<br>Route<br>Hours<br>Vary | N/A                                 | San<br>Mateo<br>County                   | Near<br>380_5.5 | 2 Bike<br>Racks               | Yes                      | Colma, San<br>Bruno, SFO<br>BART<br>Stations | N/A              |

### BART, Caltrain and CA High Speed Rail Service

Bay Area Rapid Transit (BART) and Caltrain operate passenger rail services within the vicinity of the eastern portion of the Corridor (BART and Caltrain stations are located 0.9 miles apart from each other on Huntington Avenue, near SR 82). The San Bruno BART Station, located directly north of I-380 on Huntington Avenue, connects to SFO and provides service to 44 stations within four Bay Area Counties (Alameda, Contra Costa, San Francisco and San Mateo). The San Bruno Caltrain Station is located 0.9 miles south of I-380 at the intersection of Huntington Avenue and San Mateo Avenue. The Caltrain Corridor parallels US 101 with 31 stations from San Francisco to Gilroy. BART and Caltrain merge at the only combined BART-Caltrain Station, at the Millbrae Intermodal Station located south of San Bruno, in the City of Millbrae. The average weekday ridership (2016) at BART and Caltrain stations within San Bruno are 4,059 and 717 respectively.

BART is the primary rail transit operator in the Bay Area. In 2016, the system had a daily ridership of 420,000 passengers (2015).<sup>28</sup> Two-thirds of BART's original fleet of train cars are still in use since operations began in 1972. The trains are 100 percent electric, with 53 percent of power derived from clean, hydroelectric and solar sources. Eighty-one percent of operating costs are paid by passenger fares, parking, advertising and other sources of revenue, but the system requires additional funding for maintenance and repairs. Investment is also needed to upgrade BART's deteriorating transit infrastructure, which has been a source of frequent breakdowns in recent years. In 2016, Bay Area voters approved Measure RR, a \$3.5 billion regional bond to improve BART's infrastructure. Current upgrades include an extension of service lines, new trains, and station upgrades, including Transit Oriented Developments (TODs) at several locations.

<sup>27</sup> US Census American Community Survey 2011-2015, 5-Year Estimates: Commuting Characteristics).

<sup>28</sup> BART Fact Sheet 2015: <https://www.bart.gov/sites/default/files/docs/2015%20Fact%20Sheet.pdf> (Last accessed 4/2016).

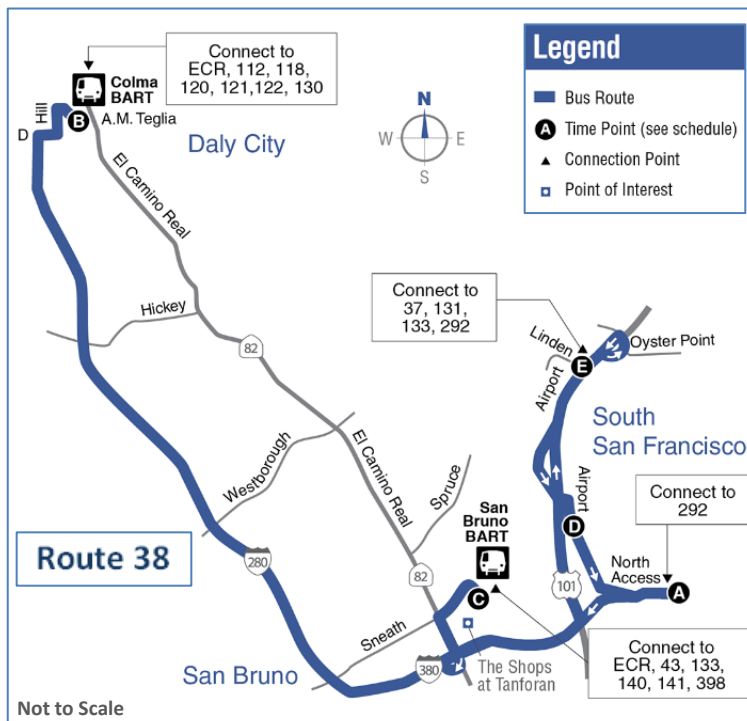
Caltrain is an intercity commuter rail line on the San Francisco Peninsula and Santa Clara Valley, which was originally the San Francisco - San Jose Commuter Rail Road built in 1863 and purchased by Southern Pacific in 1870. Followed by the rise of the automobile, the commuter rail faced a continuous declining ridership, and by 1977 petitioned the State to discontinue operations. In 1980, Caltrans contracted with Southern Pacific to subsidize operations for the passenger rail service. Caltrans purchased new locomotives and rolling stock, upgraded stations, and renamed the line “Caltrain”. Subsequently, the Peninsula Corridor Joint Powers Board (PCJPB), which consists of representatives from San Francisco, San Mateo and Santa Clara Counties, was formed to manage the line. Management and operational responsibilities were transferred from Caltrans to PCJPB in 1992.

In 2015, Caltrain hit an all-time high with a daily ridership rate of 58,429 passengers and has witnessed an increase of 4,300 new weekday riders every year since 2010. Now at crowding levels, the commuter service plans to run longer trains which will boost seat capacity from 650 riders to 780 seats per train, a 20 percent capacity increase.<sup>29</sup> The PCJPB is currently overseeing *The Caltrain Modernization Program*<sup>30</sup> that will electrify and upgrade the system using fiber optic cabling, and ultimately prepare the Corridor to accommodate California’s statewide High Speed Rail service.

Connecting with existing infrastructure, California High Speed Rail will utilize Caltrain’s rail system with upgraded high speed tracks and expand passenger service to connect Northern and Southern California by operating on an integrated system. The first phase, from San Francisco, through the Central Valley, to Los Angeles, is expected to be complete by 2029. Travel time is expected to be under three hours at speeds of over 200 miles per hour.

### San Mateo County Transit District (SamTrans) Bus Service

**Figure 6 — Transit Service on I-380 Corridor\***



\* Image: SamTrans Timetables (2016)

SamTrans is the agency responsible for public transit and transportation programs in San Mateo County including: SamTrans bus service, Redi-Wheels & RediCoast paratransit service, and Caltrain. SamTrans provides bus service throughout San Mateo County, including service on Sneath Lane and San Bruno Avenue and north-south service along El Camino Real. Route 38, shown in Figure 6, utilizes I-380 and I-280 to travel between Colma BART Station, San Bruno BART Station, SFO and Oyster Point in South San Francisco. The bus exits and re-enters I-380 to provide a stop at the San Bruno BART Station near Tanforan Mall. The route can be utilized to access SFO via Central San Bruno.

<sup>29</sup> Caltrain Board Approves \$4M to Buy Rail Cars to Ease Capacity Crunch, Friend of Caltrain, Blog: <http://www.greencaltrain.com/2014/01/caltrain-board-approves-4m-to-buy-rail-cars-to-ease-capacity-crunch/> (Last accessed 4/2016).

<sup>30</sup> Caltrain Modernization Project: <http://www.caltrain.com/projectsplans/CaltrainModernization/Modernization.html> (Last Accessed 4/2016).

## FREIGHT

The Bay Area handles nearly 30 percent of West Coast trade. The Bay Area is served by a principal international air cargo gateway at San Francisco International Airport (SFO). The airport is geographically located in San Mateo County, but it is owned and operated by the City and County of San Francisco. Cargo service is available with 56 airlines, including seven cargo-only airlines. In 2012, SFO captured 55 percent of the Bay Area air cargo market, including about 95 percent of the international market. The airport is responsible for 35,400 cargo-related jobs alone.<sup>31</sup> SFO is a major trade hub with Pacific Rim countries like South Korea, Japan, and Taiwan. Driven largely by growth in high value international trade, air cargo volumes at SFO are forecasted to increase.<sup>32</sup>

Several corporate campuses are located within San Mateo and Santa Clara Counties and act as major freight generators. Silicon Valley relies on goods movement to supply and support its high technology manufacturing industry.

Expected growth in international trade indicates the growing importance of links between major freight generators and highway facilities. I-380 is part of the National Highway Freight Network (NHFN), connecting I-280 with US 101, and SFO. US 101 is also classified as an NHFN route, however, this portion of US 101 does not presently see a high share of truck traffic. Truck counts for US 101 in San Mateo County averaged four percent of total vehicles in 2014 and approximately two percent on I-280. Truck counts on I-380 were 142,000 or 2.15 percent of the total vehicle share in 2014.<sup>33</sup> Figure 7 shows Bay Area ports and airports located within or adjacent to San Mateo County.

**Figure 7 — Bay Area Freight Map<sup>34</sup>**



<sup>31</sup> Caltrans California Freight Mobility Plan, 2014.

<sup>32</sup> Caltrans San Francisco Bay Area Freight Mobility Study, 2014:  
[http://www.dot.ca.gov/hq/tpp/offices/ogm/regional\\_level/FR3\\_SFBAFMS\\_Final\\_Report.pdf](http://www.dot.ca.gov/hq/tpp/offices/ogm/regional_level/FR3_SFBAFMS_Final_Report.pdf)

<sup>33</sup> Caltrans, Traffic Census for 2014, Average Annual Daily Truck Traffic.

<sup>34</sup> Caltrans, District 4, Office of Regional Planning and GIS (2015).

## ENVIRONMENTAL CONSIDERATIONS

The purpose of this section is to conduct a high-level identification of potential environmental factors that may require future analysis in the project development process. This information may not represent all environmental considerations that exist within the Corridor vicinity. Potential environmental issues and hazards in the Corridor area are identified in Figures 8 and 9. These include the presence of hazardous materials or facilities, habitats of threatened or potentially threatened species, fragile wetlands, and areas prone to sea-level inundation.

### Open Space and Habitat Connectivity

In the face of human development and climate change, a functional network of connected wildlands is essential to support California's diverse natural communities. Many species of plants and animals rely on connected habitats to move through territories, find mates, hunt, forage, and reproduce.

California Department of Fish and Wildlife (CDFG) and Caltrans commissioned the California Essential Habitat Connectivity Project in 2010 to produce a statewide assessment of critical habitat areas.<sup>35</sup> Areas of critical habitat and open space are located along the coastal region of San Mateo County, southward into the Santa Cruz Mountain Range, located west and south of I-380, along the I-280 Corridor. Critical areas include Crestmoor Canyon, Junipero Serra County Park, San Francisco Peninsula Watershed, and Golden Gate National Recreation Area, which are home to wildlife such as mountain lions, bobcats, coyotes, raccoons, rattlesnakes, wild pigs, scrub jays, towhees, banana slugs, raccoons, red-tailed hawks and turkey vultures. See Figure 8 for more information on environmental factors.

### Sea-Level Rise

Sea-level rise is one of the best documented and widely accepted impacts of climate change. Observation of sea levels along the California coast and of global climate models, indicate that areas along the San Francisco Bay will experience rising sea levels of 16 inches by mid-century (2050) and up to 55 inches by the end of this century.<sup>36</sup> The effects of sea level rise and flooding are expected to increasingly impact transportation infrastructure in low-lying coastal areas, including the eastern terminus of I-380, near US 101 and SFO. Rising sea levels will significantly increase the challenge to transportation managers in ensuring reliable transportation routes are available. Inundation of even small segments of the intermodal transportation system can render much larger portions impassable, disrupting connectivity and access to the wider transportation network.<sup>37</sup> Figure 9 reveals areas in which transportation assets and other facilities would be vulnerable to the overlapping risks of inundation and flood hazard by wave and tidal action.

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<sup>35</sup> CA Fish and Wildlife, BIOS Mapping: <https://map.dfg.ca.gov/bios/?bookmark=648> (Last Assessed 10/2016)

<sup>36</sup> The Federal Emergency Management Agency (FEMA), the Pacific Institute, the California Bay Coastal Development Commission (BCDC) and the U.S. Geological Survey have prepared inundation maps for the San Mateo County shoreline.

<sup>37</sup> *Guidance on Incorporating Sea Level Rise*, Caltrans Climate Change Workgroup, per California Ocean Protection Council Resolution of March 2011.

Figure 8 — Environmental Factors to Consider within I-380 Corridor Area

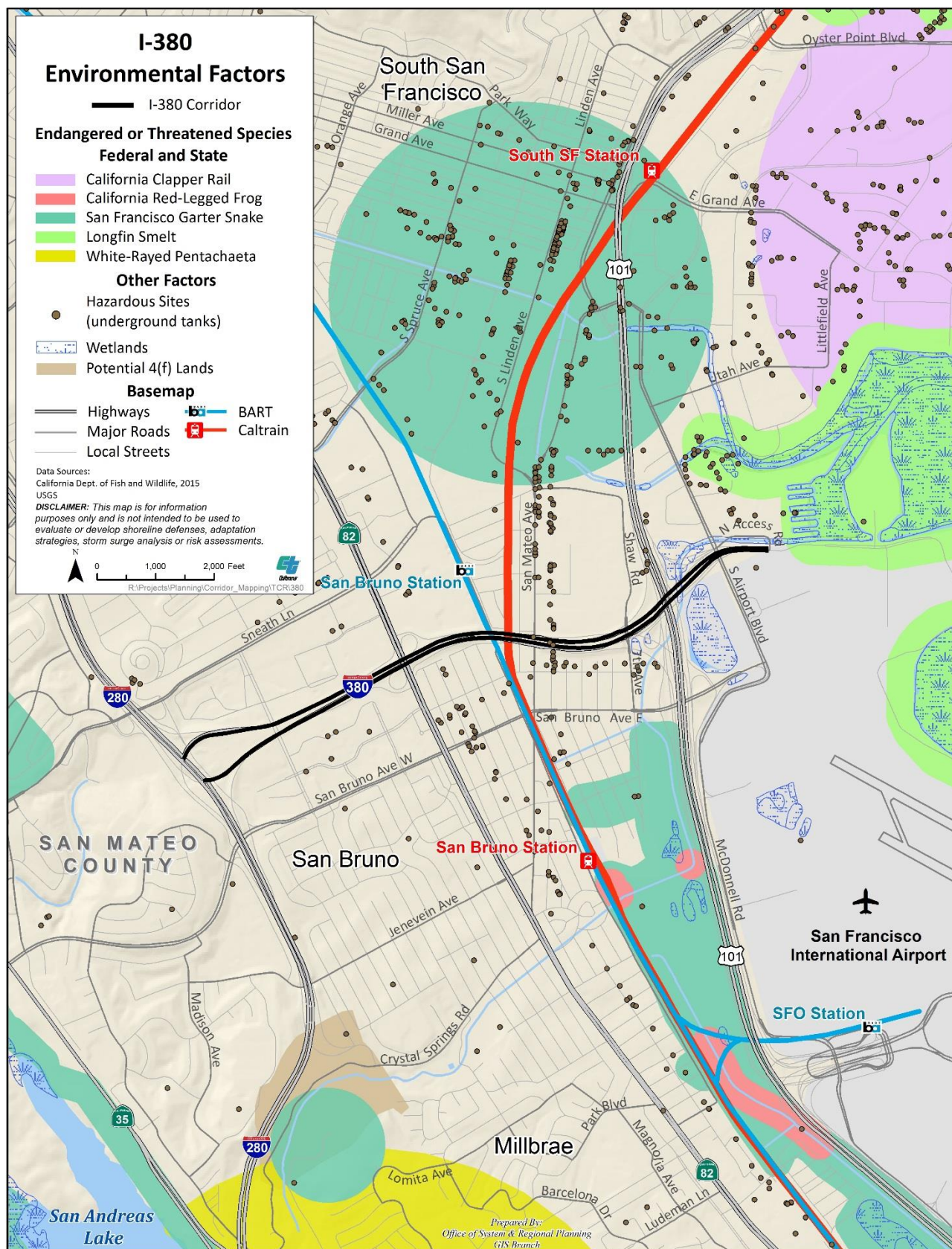
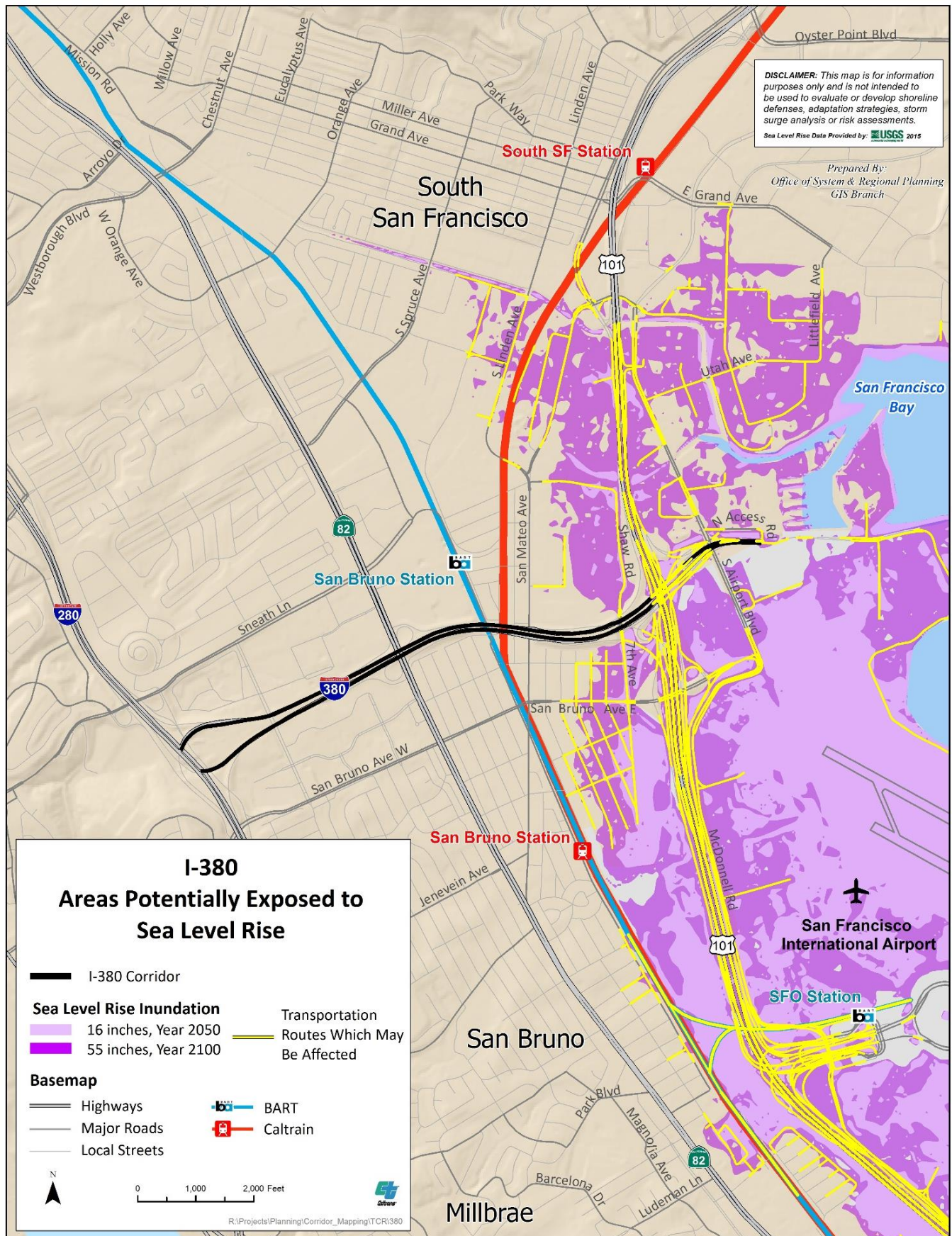


Figure 9 — Potential Sea-Level Rise Inundation Areas



## TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS (TSMO)

Caltrans is committed to optimize the performance of California's transportation systems for all users and modes of travel. TSMO strategies are essential to a performance-based decision-making process to improve the efficient and effective operation of the transportation network. Examples of TSMO strategies include, but are not limited to: ramp metering, traffic signal synchronization, Intelligent Transportation Systems (ITS), and managed lanes.<sup>38</sup> These include four types of management for improving throughput:

- **System Management** for recurring localized congestion (ramp metering, managed lanes, traveler information, dynamic speed limit, traffic signals and transit priority, Integrated Corridor Management (ICM), parking management system, and automated vehicles).
- **Incident Management** for non-recurrent congestion (detection-verification-response, Close Circuit Television, Changeable Message Signs, Highway Advisory Radio, weather detection, traveler information system, and ICM).
- **Event Management** for emergencies, disasters and other occurrences (system monitoring, evacuation management, route selection, and ICM).
- **Asset Management** for managing existing infrastructure and other assets to deliver an agreed standard of service. One of the first steps in the efficient management of the transportation system will be the completion and implementation of a Transportation Asset Management Plan.

In partnership with regional and local agencies, and other stakeholders, operational strategies form the basis of Integrated Corridor Management (ICM). TSMO and ICM require proactive integration of the transportation systems to efficiently move people and goods along highly congested urban corridors. TSMO and ICM strategies improve operations of multimodal transportation infrastructure.

Caltrans Strategic Management Plan 2015–2020 has a Strategic Objective to “effectively manage transportation assets by implementing the asset management plan and embracing a fix-it-first philosophy,” and specifies a target of “by 2020, maintain 90 percent or better ITS elements health.” Operations and maintenance resources are essential to achieving this Fix-it-First Target. Many TSMO strategies involve ITS equipment, and as more TSMO/ITS elements (ramp meters, CCTV, CMS, detection stations, etc.) are implemented, operations and maintenance resource needs will continue to grow. Tables 8 and 9 list existing and planned TSMO strategies for I-380, and a summary of general guidelines for the application of TSMO elements is provided in Appendix C (Page 44).

*Table 8— Existing TOS Elements on I-380 (2017)*

| Element | PM*  | Direction |
|---------|------|-----------|
| TMS     | 4.79 | WB, EB    |
| CCTV    | 4.80 | WB        |
| CCTV    | 4.90 | EB        |
| TMS     | 5.40 | WB, EB    |
| CCTV    | 5.40 | EB        |
| EMS     | 5.40 | WB        |
| EMS     | 5.40 | EB        |
| HAR     | 5.93 | EB        |
| CCTV    | 5.98 | EB        |

CCTV – Closed Circuit Television Camera  
CMS – Changeable Message Sign  
VMS – Variable Message Sign (smaller CMS)  
HAR – Highway Advisory Radio  
EMS – Extinguishable Message Sign used for HAR  
TMS – Traffic Monitoring Station

\* Postmile locations are approximate. This list does not reflect operational status or include information on Ramp Meters.

<sup>38</sup> [http://ops.fhwa.dot.gov/publications/managelanes\\_primer/](http://ops.fhwa.dot.gov/publications/managelanes_primer/), "Managed lanes" are defined as highway facilities or a set of lanes where operational strategies are proactively implemented and managed in response to changing conditions.

Ramp metering is a traffic management strategy that uses a system of traffic signals at freeway entrances and connector ramps to regulate the volume of traffic and spacing of vehicles entering a freeway corridor. This strategy is used to maximize the efficiency of the freeway, improve mobility, and thereby minimize the total delay within the transportation corridor. Ramp metering also assists smoother and safer merging operations which improve safety by reducing rear-end and sideswipe collisions. EB I-380 connector to NB US 101 is metered but there is no other exiting ramp meters on I-380. The following ramp metering plan is included in the Corridor Concept.

Caltrans District 4 works closely with MTC, congestion management agencies and city governments to install ramp metering on freeway ramps around the Bay Area. Ramp metering projects could be funded by various programs, including SHOPP, MTC's Freeway Performance Initiative, and local measures.

*Table 9 — 2015 Caltrans Ramp Metering Development Plan for I-380 (May, 2016)*

| County | Route | Post Mile | Direction | Location       | Ramp Type | # of Lanes | Comment     |
|--------|-------|-----------|-----------|----------------|-----------|------------|-------------|
| SM     | 380   | T4.89     | EB        | SB Rte 280     | C         | 2          | Planned     |
| SM     | 380   | T4.90     | EB        | NB Rte 280     | C         | 2          | Planned     |
| SM     | 380   | 5.30      | WB        | SB Rte 82      | S         | 1          | Planned     |
| SM     | 380   | 5.41      | EB        | SB Rte 82      | L         | 1          | Planned     |
| SM     | 380   | 5.52      | WB        | NB Rte 82      | L         | 1          | Planned     |
| SM     | 380   | 5.60      | EB        | NB Rte 82      | S         | 1          | Planned     |
| SM     | 380   | 5.98      | WB        | NB Rte 101     | C         | 2          | Planned     |
| SM     | 380   | 6.07      | WB        | SB Rte 101     | C         | 2          | Planned     |
| SM     | 380   | 6.40      | EB        | SB Rte 101     | C         | 2          | Planned     |
| SM     | 380   | 6.41      | EB        | NB Rte 101     | C         | 2          | Implemented |
| SM     | 380   | 6.46      | WB        | S Airport Blvd | S         | 2          | Planned     |
| SM     | 380   | 6.46      | WB        | N Access Rd    | S         | 1          | Planned     |

Ramp Types:

L = Loop  
C = Freeway-to-freeway Connector  
S = Slip or diagonal

\* As required by Caltrans Deputy Directive 35 R-1, each District develops a Ramp Metering Development Plan (RMDP).

### San Mateo SMART Corridor Project

The San Mateo County is in the process of implementing the SMART Corridor<sup>39</sup> project, which is an ITS project designed to improve mobility along the US 101 Corridor in San Mateo County. The estimated cost of the project is \$35M. The project is sponsored by the City/County Association of Governments of San Mateo County (C/CAG). The project is located along predefined designated arterial routes, parallel to US 101, connecting US 101 to SR 82 (El Camino Real) between I-380 and the Santa Clara County line. The Smart Corridor routes are alternate routes consisting of State Highways (I-380, SR 82, SR 84, SR 109 and SR 114) and local arterials expected to accommodate traffic diverted off the freeway due to a major incident on US 101.

The project, which has been partially implemented, will enable Caltrans and cities to implement traffic management strategies through the deployment of ITS elements along State routes and major local streets. The ITS elements to be implemented for the SMART Corridor Project include: arterial changeable message signs, center-to-center communications between the San Mateo County Hub and the District 4 Traffic Management Center (TMC), communications equipment (conduit, fiber, copper, wireless, software, and power supply line and equipment), directional signs, closed-circuit television cameras, and vehicle detection systems. A map of the SMART Corridor project is provided in Appendix C.

<sup>39</sup> <http://publicworks.smcgov.org/san-mateo-county-smart-corridors-project>

## CORRIDOR PERFORMANCE

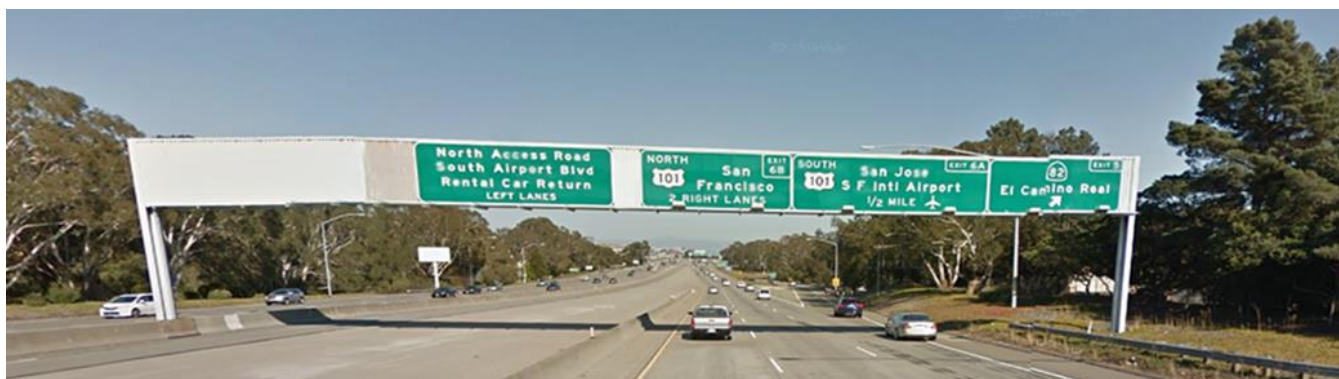


Image: Google Earth

Traffic performance data for I-380 is provided by the 2015 CCAG Level of Service (LOS) and Performance Measure Monitoring Report<sup>40</sup> and Caltrans District 4 Traffic Forecasting Branch, which uses the MTC travel demand model. The MTC model uses population and job projections to calculate growth in Annual Average Daily Traffic (AADT) and Vehicle Miles Traveled (VMT). Moderate employment and population growth is anticipated along the Corridor, which translates to moderate growth in highway traffic. As shown in Table 10, I-380 is congested during peak periods with a LOS F, and the projected annual growth in AADT is expected to increase at a rate of 0.3 percent per year.

Table 10 — I-380 Corridor Performance

| Basic System Operations                          |         |
|--|---------|
| Average Annual Daily Traffic (AADT) 2014         | 142,000 |
| AADT 2040  | 166,286 |
| AADT: Growth Rate/Year                           | 0.3%    |
| LOS Method                                       | HCM     |
| Peak Period LOS 2015                             | F       |
| VMT (BY)*  | 95,652  |
| VMT (HY)**                                       | 103,283 |
| Truck Traffic (BY)*                              |         |
| Total Average Annual Daily Truck Traffic (AADTT) | 3,052   |
| Total Trucks (% of AADT)                         | 2.15%   |
| 5+ Axle (AADTT)                                  | 797     |
| 5+ Axle Trucks (as % of AADTT)                   | 26.12%  |
| Peak Hour Traffic Data                           |         |
| Peak Hour Vehicle Hours of Delay (35 mph)*       | 28,372  |
| Peak Hour VHD (35 MPH) Method                    | PeMS    |

\* Base Year (BY) = 2014

\*\* Horizon Year (HY) = 2040

Source: 2015 San Mateo Monitoring Report, Caltrans PeMS, and Traffic Census 2014.

<sup>40</sup> CCAG LOS and Performance Measure Monitoring Report (2015): <http://ccag.ca.gov/wp-content/uploads/2015/10/2015-San-Mateo-Monitoring-Report-091415.pdf> (Last Accessed 12/2016)

## CORRIDOR ISSUES AND CONCEPT

I-380 provides a relatively reliable connection for motorized travel between I-280, US 101 and SFO during non-peak periods, but there is congestion during rush hours. Weaving is a major issue during peak periods, especially during the PM peak on Westbound I-380, between US 101 and El Camino Real. Ramp metering on NB US 101 to WB I-380 could help manage this congestion. Eastbound I-380, between I-280 and El Camino Real, experiences AM peak hour congestion caused by lane merging and short weaving distances. Planned ramp metering on SB and NB I-280 to EB I-380 could help relieve this congestion, but requires monitoring. Over the long term, ramp reconfiguration at the connectors is likely the best strategy to address weaving issues. Additional strategies, including ramp reconfiguration and lane restriping to minimize weaving, are included on page 28 of this report.<sup>41</sup>

Despite an extensive public transportation network and proximity to major employers, the rate of commute trips by single occupancy vehicles is high. This may indicate a lack of last mile service connections, including a network of bicycle lanes that connect with local Caltrain and BART stations, as well as a need for Active Transportation programs and transit incentives.

Caltrans and the California Bicycle Coalition have set a statewide goal to increase bicycle ridership to 4.5 percent of all trips by 2020. National data suggests that states with higher levels of bicycling and walking to work see lower levels of diabetes, obesity, and high blood pressure.<sup>42</sup> A growing number of people now bike for recreation, work, and shopping, and there is recognition that with an expanded and improved bicycle network, the mode share will continue to increase. Establishing lanes for average and novice bicyclists can help improve ridership rates.

### CONCEPT RATIONALE

As an important link between I-280 and SFO, the future concept for I-380 maintains the route's existing capacity and function. Using a fix-it-first approach, roadway preservation and traffic demand management is encouraged. As demand increases, the implementation of ramp meters, ITS, and possible ramp reconfiguration at connectors will help improve system performance and reliability. The concept takes many factors into account that create regional and local travel demand, including commute, freight, and recreational-based travel needs as well as surrounding land uses.

Mobility efficiency and integration between all transportation modes is needed to meet long-term State goals for reducing GHG emissions. I-380 is located within a transit-rich area and is located within a Priority Development Area. Future development within the Corridor should aim to increase bicycle, transit and walking trips.

*Table 11 — Corridor Concept Summary*

| Post Mile                 | Segment Description             | Existing Facility | 20-25 Year Concept   |
|---------------------------|---------------------------------|-------------------|--|
| SM-380<br>4.70 to<br>6.37 | I-280 to Airport<br>Access Road | 7-8 GP            | 7-8 GP<br><br>ITS deployments such as planned ramp metering and possible ramp reconfiguration at connectors to addressing weaving as well as bicycle and pedestrian issues at the end of the ramps on SR 82 (El Camino Real) * |

GP= General  
Purpose Lanes  
ITS= Intelligent  
Transportation  
Systems

\* Further study should include how these strategies will affect local circulation.

<sup>41</sup> Strategies to address weaving/merging issues along the I-380 Corridor were prepared by the San Mateo County Transportation Authority in conjunction with the cities of S. San Francisco and San Bruno. Improvement alternatives were suggested for seven locations along the I-380 Corridor and at the junctions with US 101 and I-280. Alternatives were screened for their level of environmental impacts, right of way impacts, structural assessment and potential design, as well as their acceptability to Caltrans. See Table 13. Further detail can be found in the report, *I-380 Preliminary Planning Study*, Final Draft (June 2016).

<sup>42</sup> Alliance for Biking and Walking, US Benchmark Report (2016):  
[http://www.bikewalkalliance.org/storage/documents/reports/2016benchmarkingreport\\_web.pdf](http://www.bikewalkalliance.org/storage/documents/reports/2016benchmarkingreport_web.pdf) (Last Assessed 10/2016)

## PLANNED AND PROGRAMMED PROJECTS AND STUDIES

Tables 12 and 13 list projects or studies on I-380 that will help achieve the Corridor Concept, with additional strategies to achieve the Concept identified in Table 14.

*Table 12 — I-380 Corridor Projects and Studies*

| Project Name   | Description  | Sponsor                 | Planned/<br>Programmed                          | Source Document and Program Year      | Completion Date                          |
|--|--|-------------------------|---|---------------------------------------|--|
| US 101 HOV/HOT from Santa Clara to I-380   | Modify existing lanes to accommodate an HOV lane from Whipple to San Francisco County Line and/ or an Express Lane from approximately 2 miles south of the Santa Clara County Line to San Francisco County Line. Work may include shoulder modification, ramp modifications, and interchange modifications to accommodate an extra lane. | C/CAG, Caltrans         | Programmed \$350 of 365 M                       | Draft Plan Bay Area (PBA) 2040 (2017) | Phased Project, expected completion 2020 |
| Install Accessible Pedestrian Signals (APS)  | Install APS and countdown timers in San Mateo County, on Routes 1, 35, 82, 84, 92, 101, 109, 114, 280, & 380   | Caltrans                | \$9.8M  | SHOPP 2018                            | 2025                                     |
| Improve local access at I-280/I-380 from Sneath Lane and San Bruno Avenue to I-380 | Environmental assessment of local access improvements at the existing I-280 / I-380 interchange located in the City of San Bruno. The project would provide access to I-380 from the two main east-west secondary roads of Sneath Lane and San Bruno Avenue.   | San Bruno               | Programmed Environmental Assessment Only, \$32M | Draft PBA 2040 (2017)                 | N/A                                      |
| SamTrans Bus Rapid Transit on El Camino Real                                       | This project will institute new rolling stock, automated transit signal priority, and infrastructure necessary to accommodate BRT along El Camino Real.  | SamTrans                | Programmed \$228M                               | Draft PBA 2040 (2017)                 | N/A                                      |
| Modified auxiliary lanes and/or implementation of Managed Lanes on US 101          | Add northbound and southbound modified auxiliary lanes and/ or implementation of managed lanes on U.S. 101 from I-380 to San Francisco County line   | CCAG, City of San Mateo | Programmed \$217 of 222M                        | Draft PBA 2040 (2017)                 | N/A                                      |

*Table 13 – I-380 Congestion Improvements Preliminary Planning Study<sup>43</sup>*

The following strategies are from the I-380 Congestion Improvements Preliminary Planning Study. The purpose of this study is to address congestion and weaving along the I-380 Corridor. It was sponsored by South San Francisco, San Bruno, and SMCTA. The study was finalized in June 2016.

| Issue  | Strategy   | Implementation Phase |
|--|--|----------------------|
| Address congestion and weaving, WB I-380 between El Camino Real and US 101 | Construct a collector distributor road between the NB US 101 to WB I-380 connector and west of the El Camino Real Interchange.                 | Planned (Long-term)  |
|  | Construct a collector distributor road on WB I-380 between NB & SB US 101 and the El Camino Interchange.                                       | Planned (Long-term)  |
| Address congestion and weaving, EB I-380 between I-280 and El Camino Real  | Restripe the NB and SB I-280 connectors to eliminate inside merge, carry four lanes along EB I-380, and realign EB off-ramp to El Camino Real. | Planned (Short-term) |
|  | Construct a local exit to El Camino Real from the SB I-280 collector distributor road and from the NB I-280 connector.                         | Planned (Long-term)  |

<sup>43</sup> See Appendix C for a complete list of strategies considered in the I-380 Congestion Improvements Preliminary Planning Study.

## ADDITIONAL STRATEGIES TO ACHIEVE CONCEPT

Table 14 — Proposed Projects and Strategies

| Highway Concept   |
|---|
| <p>The planned concept for I-380 focuses on Transportation System Management and Operations (TSMO), including Intelligent Transportation Systems (ITS), and strategies to minimize weaving and merging conflicts at the junctions with I-280 and US 101. It is the State's goal to manage its existing system through various system management strategies:</p> <ul style="list-style-type: none"> <li>• Minimize weaving and merging conflicts, as feasible, through ramp reconfiguration at the connectors.</li> <li>• Prioritize pavement preservation and highway maintenance on I-380.</li> <li>• Implement ITS along the Corridor, and include and monitor planned ramp metering at junctions with US 101, SR 82, I-280, Access Road, and Airport Boulevard within ten years of 2015.</li> <li>• Complete the San Mateo County SMART Corridors Project.</li> <li>• Improve local access at I-280/I-380 from Sneath Lane to San Bruno Avenue to I-380.</li> </ul>  |
| Multimodal Strategies   |
| <p>Transit, bicycle, and pedestrian strategies are aimed at integrating and enhancing networks along and across the I-380 Corridor. The following multimodal strategies should be prioritized when applicable, with attention to improve pedestrian/bicyclist access at freeway ramp crossings at the I-380 junction with SR 82.</p> <p><b>Transit</b></p> <ul style="list-style-type: none"> <li>• Support operational improvements and expansion of transit service. Work with transit operators, such as Samtrans, on planning and implementation of projects that increase people throughput in the Corridor, for example, HOV bypass lanes and bus signal priority at El Camino Real on-ramps, and improvements to amenities such as transit stops at Huntington Avenue.</li> </ul> <p><b>Bicycle</b></p> <ul style="list-style-type: none"> <li>• Encourage/Incorporate bicycle facility design treatments (bike lanes or wider shoulders, ramp reconstruction to intersect at a 90-degree angle, bike lane striping to the left of right-turn-only lane, avoidance of dual right-turn lanes) into interchange reconfiguration/reconstruction at El Camino Real. Conceptual designs from the Plan are included in Appendix C of this report.</li> <li>• Review and evaluate maintenance projects for the feasibility of incorporating striping and signage improvements to enhance bicycle access and safety at ramp intersections with local roads such as I-380/El Camino Real and I-380/I-280/San Bruno Avenue West.<sup>44</sup></li> </ul> <p><b>Pedestrian</b></p> <ul style="list-style-type: none"> <li>• Remove barriers to pedestrian circulation by squaring up ramp intersections (e.g. El Camino Real) to slow turning vehicles and shorten crossing distances, and by striping crosswalks at on and off-ramps along ramp termini to direct pedestrians and notify motorists of their presence, and adding countdown signals.</li> <li>• Review and evaluate future interchange configuration/reconstruction projects with regard to the need to provide and connect sidewalks around ramp intersections (e.g. El Camino Real), based on pedestrian demand including current and planned land use. Analyze lane width of facility to consider addition of medians to provide a pedestrian refuge and calm traffic.</li> <li>• Work with local agencies on implementing planned and programmed pedestrian and bicycle network improvements. Strategies from San Bruno's Walk and Bike Plan include increasing the visibility of pedestrians and reducing conflicts with drivers, adding high-visibility pedestrian crosswalk markings, rectangular rapid flashing beacons, yield lines and warning signs, and relocating a curb ramp at El Camino Real intersection.</li> </ul> |

<sup>44</sup> This ramp is officially part of I-280, however, the ramp crossing is located on an important bike route that traverses the length of the I-380 corridor, connecting neighborhoods and natural areas west of I-280 with Downtown San Bruno, SFO and the Bay Trail.

## CONCLUSION

The System Planning process envisions an integrated, multimodal transportation network to meet the mobility needs of local communities and the region, and to balance the State's competing transportation demands with its sustainability goals. The future concept for I-380 generally maintains the route's existing capacity and function, while introducing demand and system management strategies focused on managing our existing transportation supply more effectively and efficiently. These include operational improvements to optimize system performance such as the deployment of planned ramp metering, as well as the potential ramp reconfigurations at connectors to address weaving issues.

Additionally, strategies for transit and other modes of Active Transportation have been proposed to achieve mobility efficiency and meet long-term mobility needs and the statewide goal of reducing greenhouse gas (GHG) emissions. These strategies focus on multimodal safety and accessibility to core workplace, shopping and public destinations, transit centers, and connections to designated bicycle routes.

## APPENDICES

### APPENDIX A: GLOSSARY OF TERMS AND ACRONYMS

#### **Acronyms**

AADT – Annual Average Daily Traffic  
AADTT – Annual Average Daily Truck Traffic  
AB – Assembly Bill  
ABAG – Association of Bay Area Governments  
ADA – Americans with Disabilities Act of 1990  
ADT – Average Daily Traffic  
Alameda CTC – Alameda County Transportation Commission  
ATP – Active Transportation Program  
BAAQMD – Bay Area Air Quality Management District  
BCDC – Bay Conservation and Development Commission  
BRT – Bus Rapid Transit  
BY – Base Year  
Caltrans – California Department of Transportation  
CARB – California Air Resources Board  
CCAG – City/County Association of Governments of San Mateo County  
CCC – California Conservation Corps  
CCTA – Contra Costa Transportation Authority  
CEC – California Energy Commission  
CESA – California Endangered Species Act  
CFAC – California Freight Advisory Committee  
CFMP – California Freight Mobility Plan  
CMA – Congestion Management Agencies  
CMAQ – Congestion Mitigation and Air Quality  
CMP – Congestion Management Plan  
CSFAP – California Sustainable Freight Action Plan  
CSMP – Corridor System Management Plan  
CEQA – California Environmental Quality Act  
CSS – Context Sensitive Solutions  
CTC – California Transportation Commission  
CTP – California Transportation Plan  
DD – Deputy Directive  
DSMP – District System Management Plan  
DFW- Department of Fish and Wildlife  
ECA – Essential Connectivity Areas  
EPA – Environmental Protection Agency  
FAST Act – Fixing America’s Surface Transportation Act  
FASTLANE – Fostering Advancements in Shipping and Transportation for the Long-Term Achievement of National Efficiencies grant program  
FHWA – Federal Highway Administration  
FSR – Feasibility Study Report  
FSTIP – Federal Statewide Transportation Improvement Program  
FTA – Federal Transit Administration  
FTIP – Federal Transportation Improvement Program  
GHG – Greenhouse Gas

GIS – Geographic Information System  
 HCP – Habitat Conservation Plan  
 HOT – High Occupancy Toll lane  
 HOV – High Occupancy Vehicle lane  
 HY – Horizon Year  
 ICM – Integrated Corridor Mobility  
 IGR – Intergovernmental Review  
 ITIP – Interregional Transportation Improvement Program  
 ITS – Intelligent Transportation System  
 ITSP – Interregional Transportation Strategic Plan  
 KPRA – Kingpin-to-Rear-Axle  
 LOS – Level of Service  
 MAP-21 – Moving Ahead for Progress in the 21<sup>st</sup> Century  
 MPO – Metropolitan Planning Organizations  
 MTC – Metropolitan Transportation Commission  
 NOA – Naturally Occurring Asbestos  
 NCCP – Natural Community Conservation Plan  
 NEPA – National Environmental Policy Act  
 NHS – National Highway System  
 NHFN – National Highway Freight Network  
 NMFN – National Multimodal Freight Network  
 NVTa – Napa Valley Transportation Authority  
 PAED – Project Approval/Environmental Document  
 PBA – Plan Bay Area  
 PCA – Priority Conservation Area  
 PDA – Priority Development Area  
 PFN – Primary Freight Network  
 PID – Project Initiation Document  
 PIR – Project Initiation Report  
 PM – Post Mile  
 PM 2.5 – Particulate Matter 2.5 micrometers or less in diameter  
 PM 10 – Particulate Matter 10 micrometers or less in diameter  
 PSR – Project Study Report  
 PR – Project Report  
 PTSF – Percent Time Spent Following  
 RHNA – Regional Housing Needs Allocation  
 RTP – Regional Transportation Plan  
 RTIP – Regional Transportation Improvement Program  
 RTPA – Regional Transportation Planning Agencies  
 SACOG – Sacramento Area Council of Governments  
 SAFETEA-LU – Safe, Accountable, Flexible and Efficient Transportation Equity Act, a Legacy for Users  
 SB – Senate Bill  
 SCS – Sustainable Community Strategies  
 SCTA – Sonoma County Transportation Authority  
 SFCTA – San Francisco County Transportation Authority  
 SHOPP – State Highway Operation Protection Program  
 SHS – State Highway System  
 SJCOG – San Joaquin Council of Governments  
 SMF – Smart Mobility Framework  
 SR – State Route  
 STA – Solano Transportation Authority

STIP – State Transportation Improvement Program  
STP – Surface Transportation Program  
STRAHNET – Strategic Highway Network  
TAM – Transportation Authority of Marin  
TCIF – Trade Corridors Improvement Fund  
TCRP – Transit Cooperative Research Program  
TEA-21 – Transportation Equity Act for the 21st Century  
TCR – Transportation Concept Report  
TIGER – Transportation Investment Generating Economic Recovery  
TDM – Transportation Demand Management  
TMP – Transportation Management Plan  
TMS – Transportation Management System  
TSN – Transportation System Network  
USFWS – United States Fish and Wildlife Service  
VMT – Vehicle Miles Traveled  
VTA – Santa Clara Valley Transportation Authority  
VPH – Vehicles per Hour

## **Definitions**

AADT – Annual Average Daily Traffic is the total volume for the year divided by 365 days. The traffic count year is from October 1st through September 30<sup>th</sup>. Traffic counting is generally performed by electronic counting instruments moved from location throughout the State in a program of continuous traffic count sampling. The resulting counts are adjusted to an estimate of annual average daily traffic by compensating for seasonal influence, weekly variation and other variables which may be present. Annual ADT is necessary for presenting a statewide picture of traffic flow, evaluating traffic trends, computing accident rates, planning and designing highways and other purposes.

Base Year – The year that the most current data is available to the Districts.

Bikeway Class I (Bike Path) – Provides a completely separated right of way for the exclusive use of bicycles and pedestrians with cross flow by motorists minimized.

Bikeway Class II (Bike Lane) – Provides a striped lane for one-way bike travel on a street or highway.

Bikeway Class III (Bike Route) – Provides for shared use with pedestrian or motor vehicle traffic.

Bikeway Class IV (Separated Bikeway/Cycle Track) – Provides for exclusive use for bicycles by separating bikeway from motor vehicle traffic.

Bottlenecks – A bottleneck is a location where traffic demand exceeds the effective carrying capacity of the roadway. In most cases, the cause of a bottleneck relates to a sudden reduction in capacity, such as a lane drop, merging and weaving, driver distractions, a surge in demand, or a combination of factors.

Capacity – The maximum sustainable hourly flow rate at which persons or vehicles reasonably can be expected to traverse a point or a uniform section of a lane or roadway during a given time period under prevailing roadway, environmental, traffic, and control conditions.

**Capital Facility Concept** – The 20-25 year vision of future development on the route to the capital facility. The capital facility can include capacity increasing, State Highway, bicycle facility, pedestrian facility, transit facility (Intercity Passenger Rail, Mass Transit Guideway etc.), grade separation, and new managed lanes.

**Conceptual Project** – A conceptual improvement or action is a project that is needed to maintain mobility or serve multimodal users, but is not currently included in a fiscally constrained plan and is not currently programmed. It could be included in a General Plan or in the unconstrained section of a long-term plan.

**Corridor** – A broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways, bicycle, pedestrian, and transit route alignments. Off system facilities are included as informational purposes and not analyzed in the TCR.

**Express Lanes** – Specially designated highway lanes that are toll-free for carpools, vanpools, motorcycles, buses and eligible clean-air vehicles. Solo drivers can choose to pay a toll to access the lanes for reliable travel times.

**Facility Concept** – Describe the Facility and strategies that may be needed within 20-25 years. This can include capacity increasing, State Highway, bicycle facility, pedestrian facility, transit facility, Non-capacity increasing operational improvements, new managed lanes, conversion of existing managed lanes to another managed lane type or characteristic, TMS field elements, Transportation Demand Management and Incident Management.

**Facility Type** – The facility type describes the State Highway facility type. The facility could be freeway, expressway, conventional, or one-way city street.

**Freight Generator** – Any facility, business, manufacturing plant, distribution center, industrial development, or other location (convergence of commodity and transportation system) that produces significant commodity flow, measured in tonnage, weight, carload, or truck volume.

**Headway** – The time between two successive transit net vehicles as they pass a point on the roadway, measured from the same common feature of both vehicles.

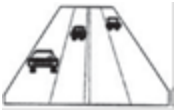
**Horizon Year** – The year that the future (20-25 years) data is based on.

**Intermodal Freight Facility** – Intermodal transport requires more than one mode of transportation. An intermodal freight facility is a location where different transportation modes and networks connect and freight is transferred (or “transloaded”) from one mode, such as rail, to another, such as truck.

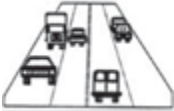
**IRRS** – The Interregional Road System, a series of interregional State highways outside the urbanized areas that provides access to, and links between, the State’s economic centers, major recreational areas, and urban and rural regions.

**ITS** – Intelligent Transportation System improves transportation safety and mobility and enhances productivity through the integration of advanced communications technologies into the transportation infrastructure and in vehicles. Intelligent Transportation Systems encompass a broad range of wireless and wireline communications-based information and electronics technologies to collect and process information, and take appropriate actions.

**LOS** – Level of Service is a qualitative measure describing operational conditions within a traffic stream and their perception by motorists. A LOS definition generally describes these conditions in terms of speed, travel time, freedom to maneuver, traffic interruption, comfort, and convenience. Six levels of LOS can generally be categorized as follows:



**LOS A** describes free flowing conditions. The operation of vehicles is virtually unaffected by the presence of other vehicles, and operations are constrained only by the geometric features of the highway.



**LOS B** is also indicative of free-flow conditions. Average travel speeds are the same as in LOS A, but drivers have slightly less freedom to maneuver.



**LOS C** represents a range in which the influence of traffic density on operations becomes marked. The ability to maneuver with the traffic stream is now clearly affected by the presence of other vehicles.



**LOS D** demonstrates a range in which the ability to maneuver is severely restricted because of the traffic congestion. Travel speed begins to be reduced as traffic volume increases.



**LOS E** reflects operations at or near capacity and is quite unstable. Because the limits of the level of service are approached, service disruptions cannot be damped or readily dissipated.



**LOS F** describes a stop and go, low speed conditions with little or poor maneuverability. Speed and traffic flow may drop to zero and considerable delays occur. For intersections, LOS F describes operations with delay in excess of 60 seconds per vehicle. This level, considered by most drivers unacceptable often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection.

**Multi-modal** – The availability of transportation options using different modes within a system or corridor, such as automobile, subway, bus, ferry, rail, or air.

**Managed Lanes** – highway facilities or a set of lanes where operational strategies are proactively implemented and managed in response to changing conditions.

**NHFS** – a federally established freight network to strategically direct Federal resources and policies toward improved performance of highway portions of the U.S. freight transportation system.

**National Highway System (NHS)** – a federally established interconnected system of principle arterial routes to serve major travel destinations and population centers, international border crossings, as well as ports, airports, public transportation facilities, and other intermodal facilities. The NHS must also meet national defense requirements and server interstate and interregional travel.

**Peak Hour** – The hour of the day in which the maximum volume occurs across a point on the highway.

**Peak Hour Volume** – The hourly volume during the highest hour traffic volume of the day traversing a point on a highway segment. It is generally between 6 percent and 10 percent of the ADT. The lower values are generally found on roadways with low volumes.

**Planned Project** – A planned improvement or action is a project in a fiscally constrained section of a long-term plan, such as an approved Regional or Metropolitan Transportation Plan (RTP or MTP), Capital Improvement Plan, or local Sales Tax Measure.

**Post Mile** – A post mile is an identified point on the State Highway System. The milepost values increase from the beginning of a route within a county to the next county line. The milepost values start over again at each county line. Milepost values usually increase from south to north or west to east depending upon the general direction the route follows within the State. The milepost at a given location will remain the same year after year. When a section of road is relocated, new milepost (usually noted by an alphabetical prefix such as "R" or "M") are established for it. If relocation results in a change in length, "milepost equations" are introduced at the end of each relocated portion so that mileposts on the remainder of the route within the county will remain unchanged.

**Programmed Project** – A programmed improvement or action is a project in a near-term programming document identifying funding amounts by year, such as the State Transportation Improvement Program (STIP) or the State Highway Operations and Protection Program (SHOPP).

**Route Designation** – A route's designation is adopted through legislation and identifies what system the route is associated with on the State Highway System. A designation denotes what design standards should apply during project development and design. Typical designations include but not limited to National Highway System (NHS), Interregional Route System (IRRS), and Scenic Highway System.

**P3** - A public-private partnership, which is a cooperative arrangement between one or more public and private sectors.

**Post 25-Year Concept** – This dataset may be defined and re-titled at the District's discretion. In general, the post 25-year concept could provide the maximum reasonable and foreseeable roadway needed beyond a 20 to 25 year horizon. The post 25-year concept can be used to identify potential widenings, realignments, future facilities, and rights-of-way required to complete the development of each corridor.

**Relinquishment** – the act and the process of legally transferring property rights, title, liability, and maintenance responsibilities of a portion or entirety of a State highway or a Park-and-Ride lot to another entity.

**Rural** – Fewer than 5,000 in population designates a rural area. Limits are based upon population density as determined by the U.S. Census Bureau.

**Segment** – A portion of a facility between two points.

**TDM** – Transportation Demand Management programs designed to reduce or shift demand for transportation through various means, such as the use of public transportation, carpooling, telework, and alternative work hours. Transportation Demand Management strategies can be used to manage congestion during peak periods and mitigate environmental impacts.

**TSMO** – Integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects, describing the system operations and management elements that may be needed within 20-25 years. This can include Non-capacity

increasing operational improvements (auxiliary lanes, channelization's, turnouts, etc.), conversion of existing managed lanes to another managed lane type or characteristic (e.g. HOV lane to HOT lane), TMS Field Elements, Transportation Demand Management, and Incident Management.

Urban – 5,000 to 49,999 in population designates an urban area. Limits are based upon population density as determined by the U.S. Census Bureau.

Urbanized – Over 50,000 in population designates an urbanized area. Limits are based upon population density as determined by the U.S. Census Bureau.

VMT – Is the total number of miles traveled by motor vehicles on a road or highway segments.

## APPENDIX B: FEDERAL, STATE, AND REGIONAL PLANS AND POLICIES

### FEDERAL

#### Fixing America's Surface Transportation Act (FAST Act) December, 2015

FAST Act will provide \$305 Billion in funding for surface transportation programs and was signed into law in December 2015. The federal spending bill replaces MAP-21, Moving Ahead for Progress in the 21<sup>st</sup> Century signed into law in 2012. FAST Act provides funding for highway, transit, and railroad networks, most of which will be distributed to state departments of transportation and local transit agencies.

#### Federal Transportation Improvement Program (FTIP)

All federally funded projects, and regionally significant projects (regardless of funding), must be listed in the FTIP per federal law. A project is not eligible to be programmed in the FTIP until it is programmed in the *State Transportation Improvement Program (STIP)* or in the *State Highway Operations and Protection Program (SHOPP)*. Other types of funding (Federal Demonstration, Congestion Mitigation and Air Quality (CMAQ), Transportation Enhancement Activities (TEA), and Surface Transportation Program (STP) must be officially approved before the projects can be included in the FTIP.

### STATE

#### California Transportation Plan (CTP) 2040

The CTP is a long-range policy framework to meet California's future multi-modal mobility needs and reduce greenhouse gas and particulate matter (PM) emissions. The CTP defines goals, performance-based policies, and strategies to achieve a collective vision for California's future Statewide, integrated, multimodal transportation system. A new updated plan was recently finalized in June 2016. It focuses on meeting new trends and challenges, such as economic and job growth, climate change, freight movement, and public health. In addition, performance measures and targets were developed to assess performance of the transportation system to meet the requirements of MAP-21.

#### California Interregional Blueprint (CIB)

Responding to Senate Bill 391 of 2009, CIB informs and enhances the State's Transportation Planning process. Similar to requirements for regional transportation plans under Senate Bill 375, SB 391 requires the State's long-range transportation plan to meet California's climate change goals under Assembly Bill 32. In response to these statutes, Caltrans is preparing a state-level transportation blueprint to inform CTP 2040 and articulate the State's vision for an integrated, multi-modal interregional transportation system that integrates the Regional Blueprint Program (see the Regional appendix section) and complements regional transportation plans. The CIB will integrate the State's long-range multi-modal plans and Caltrans-sponsored programs with the latest technology and tools to enhance our ability to plan for and manage a transportation system that will expand mode choices and meet future increases in transportation needs and still meet the GHG-reduction targets or SB 375.

#### State Transportation Improvement Program (STIP)

The STIP is a multi-year capital improvement program of transportation projects on and off the State Highway System, funded with revenues from the Transportation Investment Fund and other funding sources. Caltrans and the regional Planning agencies prepare transportation improvement plans for submittal. Local agencies work through their Regional Transportation Planning Agency (RTPA), County Transportation Commission, or Metropolitan Planning Organization (MPO), as appropriate, to nominate projects for inclusion in the STIP.

#### Interregional Transportation Improvement Program (ITIP)

The Interregional Transportation Improvement Program (ITIP) is a State funding program for the Interregional Improvement Program (IIP) and is a sub-element of the State Transportation Improvement Program. The 2014 ITIP is a five year program of projects from fiscal years 2014-15 through 2018-19. The IIP is a State funding category created in SB 45 for intercity rail, interregional road or rail expansion projects outside urban areas, or projects of statewide significance, which include projects to improve State highways, the intercity passenger rail system, and the interregional movement of people, vehicles, and goods. Caltrans nominates and the California Transportation Commission approves a listing of interregional highway and rail projects for 25 percent of the funds to be programmed in the STIP (the other 75 percent are Regional Improvement Program funds). Only projects planned on State highways are to be included in this program.

#### Interregional Transportation Strategic Plan (ITSP) 2015

The ITSP is a California Department of Transportation (Caltrans) document that provides guidance for the identification and prioritization of interregional State highway projects. The ITSP promotes the State of California's role of improving mobility while providing opportunity for efficient goods movement. It also provides summary information regarding other interregional transportation modes—in particular, intercity passenger rail. The ITSP highlights critical Planning considerations such as System Planning, complete streets, and climate change.

#### District System Management Plan (DSMP)

The DSMP provides a vehicle for the development of multi-modal and multi-jurisdictional transportation strategies. These strategies must be based on an analysis that is developed in partnership with regional and local agencies. The DSMP is the State's counterpart to the Regional Transportation Plan (RTP) for the region. The former Transportation System Development Program (TSDP) is now incorporated within this management plan as a Project List.

#### State Highway Operation and Protection Program (SHOPP)

Caltrans prepares the SHOPP for the expenditure of transportation funds for major capital improvements necessary to preserve and protect the State Highway System. The SHOPP is a four-year funding program, focusing available resources on the most critical categories of projects: safety mandates, bridge, and pavement preservation. The 10-Year SHOPP anticipates long-term projected expansion and maintenance needs.

#### Ten-Year SHOPP

The Ten-Year SHOPP is a State plan for the rehabilitation and reconstruction, of State highways and bridges by the SHOPP. The purpose of the Plan is to identify needs for the upcoming ten years. The Plan is updated every two years. It includes specific milestones, quantifiable accomplishments and strategies to control cost and improve the efficiency of the Program. The Ten-Year SHOPP differs from SHOPP, as it has no funding constraints assigned.

#### Senate Bill 45 (SB 45)

SB 45 (1997) establishes guidelines for the California Transportation Commission to administer the allocation of funds appropriated from the Public Transportation Account for capital transportation projects designed to improve transportation facilities.

#### Smart Mobility Framework

Caltrans released *Smart Mobility 2010: A Call to Action for the New Decade* in February 2010. SMF was prepared in partnership with US Environmental Protection Agency, the Governor's Office of Planning and Research, and the California Department of Housing and Community Development to address both long-range challenges and short-term pragmatic actions to implement multi-modal and sustainable transportation strategies in California.

*Smart Mobility 2010* provides new tools and techniques to improve Planning. It links land use “place types,” considers growth scenarios and how growth will best gain the benefits of smart mobility. The SMF emphasizes travel choices, healthy, livable communities, reliable travel times for people and freight, and safety for all users. This vision supports the goals of social equity, climate change intervention, and energy security as well as a robust and sustainable economy.

Caltrans Deputy Directive 64-R2 *Complete Streets - Integrating the Transportation System, 2008 & 2014*

This Deputy Directive expresses Caltrans commitment to provide for the needs of all travelers including pedestrians, bicyclists and persons with disabilities in all programming, Planning, maintenance, construction, operations, and project development activities and products.

State Assembly Bill 32 (AB 32) *Global Warming Solutions Act, September 2006*

This bill requires the State’s greenhouse gas emissions to be reduced to 1990 levels by the Year 2020. Caltrans strategy to reduce global warming emissions has two elements. The first is to make transportation systems more efficient through operational improvements. The second is to integrate emission reduction measures into the Planning, development, operations and maintenance of transportation elements.

Senate Bill 375 (SB 375) *Addressing Greenhouse Gas Emissions from the Transportation Sector*

SB 375 provides a means for achieving AB 32 goals from cars and light trucks. The transportation sector contributes over 40 percent of the GHGs throughout the State. Automobiles and light trucks alone contribute almost 30 percent. SB-375 requires the California Air Resources Board (ARB) to develop regional greenhouse gas (GHG) emission reduction targets for cars and light trucks for each of the 18 Metropolitan Planning Organizations (MPOs). Through their Planning processes, each of the MPOs is required to develop plans to meet their regional GHG reduction target. This would be accomplished through either the financially constrained “Sustainable Communities Strategy” as part of their Regional Transportation Plan (RTP) or an unconstrained alternative Planning strategy. SB-375 also provides streamlining of California Environmental Quality Act (CEQA) requirements for specific residential and mixed-use developments.

Senate Bill 391 (SB 391) *California Transportation Plan updates, 2009*

This bill requires the department to update the California Transportation Plan (CTP) by December 31, 2015, and every five years thereafter. The bill requires the CTP to address how the State will achieve maximum feasible emissions reductions in order to attain a statewide reduction of greenhouse gas emissions to 1990 levels by 2020 and 80 percent below 1990 levels by 2050. SB 391 requires the Plan to identify the statewide integrated multimodal transportation system needed to achieve these results. CTP was finalized in June 2016.

Senate Bill 743 (SB 743) *California Environmental Quality Act (CEQA) updates, 2013*

This bill requires the Office of Planning and Research to update guidelines for analyzing transportation project impacts as they relate to CEQA legislation. Vehicle Miles Traveled (VMT) provides an alternative to LOS for evaluating transportation impacts. Particularly within areas served by transit, those alternative criteria must “promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses.” Alternative criteria may include “vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated.”

Caltrans - Climate Action Plan

Greenhouse gas (GHG) emissions and the related subject of global climate change are emerging as critical issues for the transportation community. Caltrans recognizes the significance of cleaner, more energy efficient transportation. On June 1, 2005 the State established climate change emissions reduction targets for California that lead to development of the Climate Action Program. This program highlights reducing congestion and improving efficiency of transportation systems through smart land use, operational improvements, and Intelligent Transportation Systems (objectives of the State’s Strategic Growth Plan). The Climate Action Plan approach also includes institutionalizing energy efficiency and GHG emission reduction

measures and technology into Planning, project development, operations, and maintenance of transportation facilities, fleets, buildings, and equipment.

#### Corridor System Management Plans (CSMP)

In 2007, the California Transportation Commission adopted a resolution stating “...the Commission expects Caltrans and regional agencies to preserve the mobility gains of urban corridor capacity improvements over time that will be described in Corridor System Management Plans (CSMPs).” A CSMP is a Transportation Planning document that will study the facility based on comprehensive performance assessments and evaluations. The strategies are phased, and include both operational and more traditional long-range capital expansion strategies. They take into account transit usage, projections, and interactions with arterial network, and connection to State highways. Each CSMP presents an analysis of existing and future traffic conditions and proposes traffic management strategies and capital improvements to maintain and enhance mobility within each corridor.

A CSMP results in a listing and phasing plan of recommended operational improvements, Intelligent Transportation System (ITS) strategies, and system expansion projects to preserve or improve performance measures within the corridor. CSMPs are required for all projects receiving Proposition 1B (2006) Corridor Mobility Improvement Account (CMIA) funding.

#### California Freight Mobility Plan Dec. 2014

The California State Transportation Agency (CalSTA) and Caltrans developed a State freight plan, titled the California Freight Mobility Plan (CFMP). Per Assembly Bill 14 (Lowenthal, 2013) the CFMP is a comprehensive plan that governs the immediate and long-range Planning activities and capital investments of the State with respect to the movement of freight. The CFMP will also comply with the relevant provisions of the federal Moving Ahead for Progress in the 21st Century Act (MAP-21) which encourages each state to develop a freight plan. The CFMP is a modal plan contributing to the Department’s ongoing *California Interregional Blueprint (CIB)* initiative. The plan will also incorporate information from the Freight Element of the *California State Rail Plan*. It will use recent freight industry information developed by seaports, railroads, airports, and others, as well as benefit from important regional freight mobility planning programs by partner agencies.

#### California State Rail Plan (CSRP), 2013

The California State Rail Plan is a plan for passenger and freight rail to address environmental, economic development, and population growth challenges such as increased travel demand, traffic congestion, and Greenhouse Gas emissions. CSRP programs additional funding for capital investments, operations, and maintenance. The plan provides a framework for improving the State’s rail system, noting improvements, future needs, and plans for expansion/integration of rail services.

## **REGIONAL**

#### Regional Transportation Plan (RTP) “Plan Bay Area”

Plan Bay Area is a long-range integrated transportation and land-use/housing strategy through 2040 for the San Francisco Bay Area. On July 18, 2013, the Plan was jointly approved by the Association of Bay Area Governments (ABAG) Executive Board and by the Metropolitan Transportation Commission (MTC). The Plan includes the region’s Sustainable Communities Strategy (SCS) and the 2040 Regional Transportation Plan represents the next iteration of a Planning process that has been in place for decades.

Plan Bay Area marks the nine-county region’s first long-range plan to meet the requirements of California’s landmark 2008 Senate Bill 375, which calls on each of the State’s 18 metropolitan areas to develop a Sustainable Communities Strategy (SCS) to accommodate future population growth and reduce greenhouse

gas emissions from cars and light trucks. Working in collaboration with cities and counties, the Plan advances initiatives to expand housing and transportation choices, create healthier communities, and build a stronger regional economy.

#### Regional Transportation Improvement Program (RTIP)

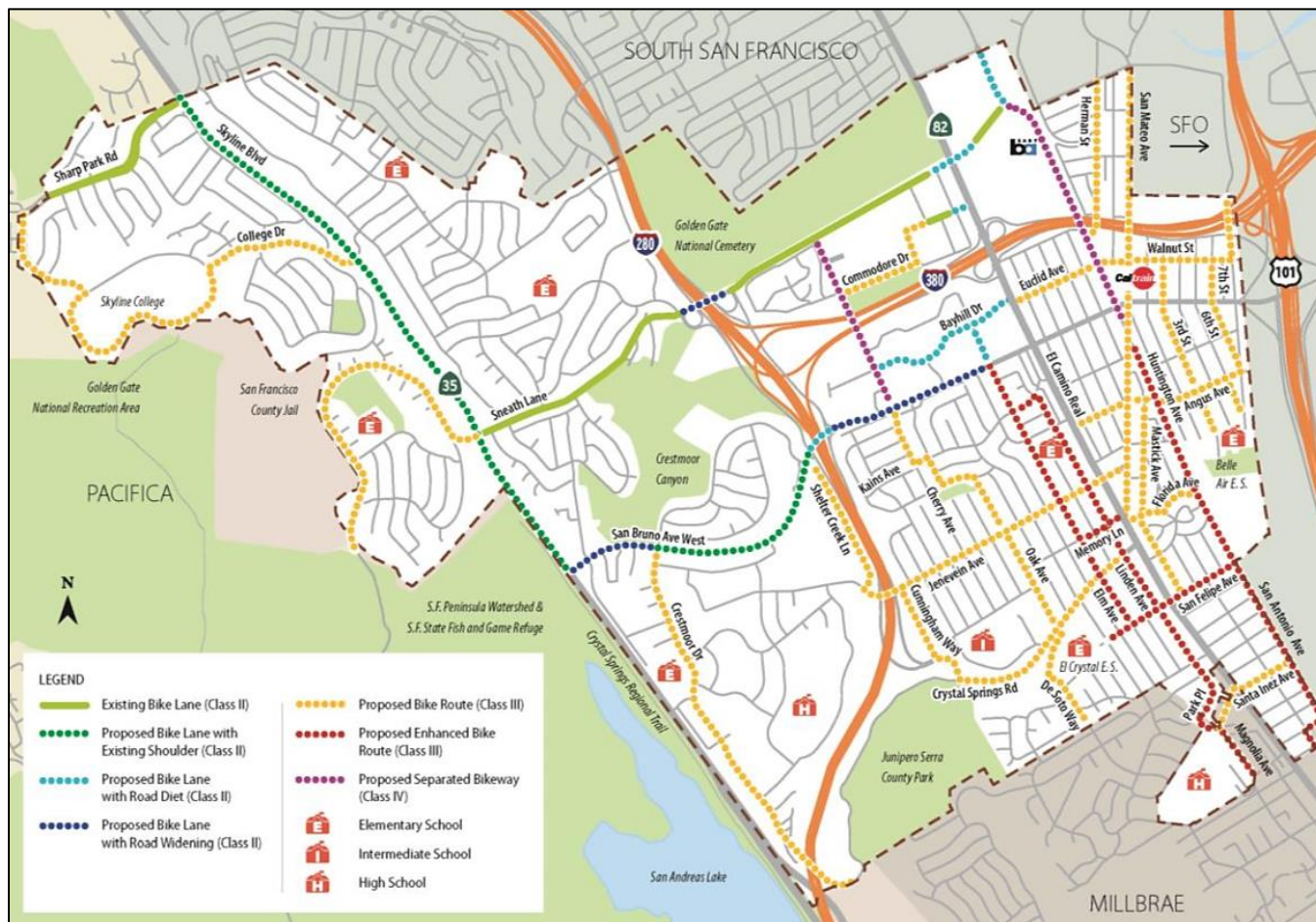
The Regional Transportation Improvement Program is a sub-element of the State Transportation Improvement Program (STIP). The Metropolitan Transportation Commission is responsible for developing regional project priorities for the RTIP for the nine counties of the Bay Area. The biennial RTIP is then submitted to the California Transportation Commission for inclusion in the STIP.

#### Freeway Performance Initiative (FPI)

This is the Metropolitan Transportation Commission's ongoing effort to improve the operations, safety, and management of the Bay Area's freeway network by deploying system management strategies, completing the HOV lane system, addressing regional freight issues, and closing key freeway infrastructure gaps.

## APPENDIX C: SUPPLEMENTARY INFORMATION

### Walk 'N Bike Plan, City of San Bruno (2016)



## Conceptual Designs for I-380/SR 82 (El Camino Real) Pedestrian Improvements<sup>45</sup>

**Figure 1 |** Conceptual design for El Camino Real / I-380 ramps—short/medium terms

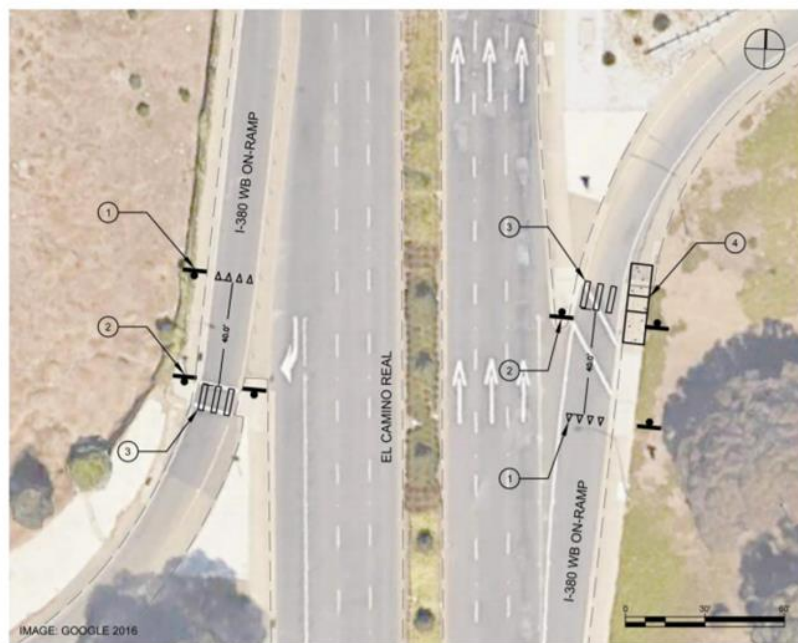


Image credit: Parisi Transportation Consulting



EXAMPLE FACILITY: CROSSWALK AT RAMP

### NOTES

- ① YIELD SIGNS AND YIELD LINES
- ② PEDESTRIAN CROSSING WARNING SIGNS + RECTANGULAR RAPID FLASH BEACONS (RRFB)
- ③ HIGH-VISIBILITY CROSSWALK MARKINGS
- ④ RELOCATED CURB RAMP

**Figure 2 |** Conceptual design for El Camino Real / I-380 ramps—longer term

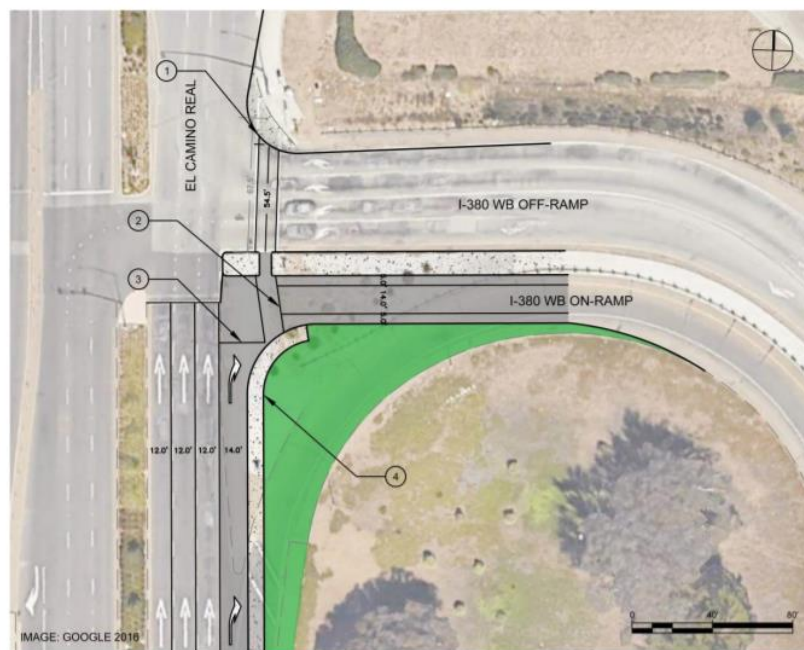


Image credit: Parisi Transportation Consulting



EXAMPLE FACILITY - SQUARED-OFF LOOP RAMPS

### NOTES

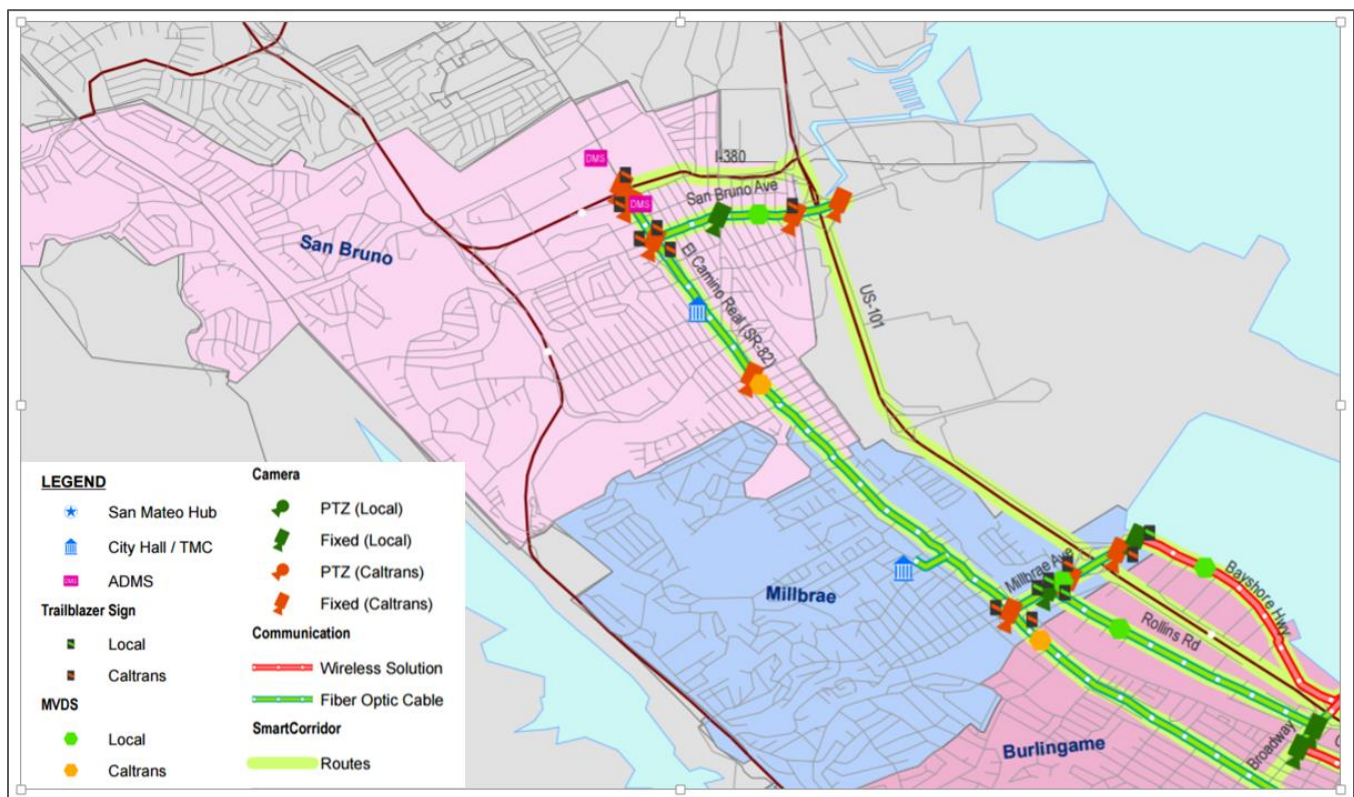
- ① BULB-OUT WITH REDUCED CORNER CURB RADIUS
- ② ON-RAMP REALIGNMENT (SQUARE-UP)
- ③ RIGHT TURN POCKET
- ④ NEW SIDEWALK

<sup>45</sup> San Bruno Walk 'n Bike Plan (2016), <https://sanbruno.ca.gov/civicax/filebank/blobdload.aspx?blobid=27455> (Last Accessed: 2/2017)

## TSMO Placement Guidelines

Generally, Traffic Monitoring Stations (TMS) are considered for installation every third-mile to half-mile. Closed Circuit Television (CCTV) cameras are usually placed approximately every mile on the freeway/highway if the line-of-sight from vehicles is acceptable, and may be placed more closely together for bridges and tunnels. Changeable Message Signs (CMS) that provide information to motorists about incidents and traffic problems are usually placed before freeway-to-freeway interchanges to help motorists make informed choices before reaching the interchange. Variable Message Signs (VMS), which are smaller changeable message signs, also provide information to motorists about incidents and traffic problems. Highway Advisory Radio (HAR) is used for longer messaging, with Extinguishable Message Signs (EMS), and more recently VMS, alerting motorists that radio broadcasting is available to them to get more detailed information. Caltrans is planning for increased use of fiber optics in its transportation communication systems, and is looking to expand the use of fiber optics throughout the District as funding allows.

### San Mateo SMART Corridor Map (I-380 Segment)<sup>46</sup>



<sup>46</sup> <http://publicworks.smcgov.org/sites/publicworks.smcgov.org/files/documents/files/San%20Mateo%20Smart%20Corridor%20Map%202.pdf>

## Summary of I-380 Congestion Improvement Preliminary Planning Study Recommendations

| Location   | Short/Long Term Alternative | Description   | Cost/Benefits  |
|--|-----------------------------|---|--|
| Westbound I-380 between El Camino Real and US 101              | Short Term                  | Install signage for SB US 101 motorists to access El Camino Real via the San Bruno Avenue exit, located just south of the I-380/US 101 interchange.   | Directing traffic to San Bruno Avenue interchange would reduce the heavy weaving movements between US 101 connectors and the El Camino Real off-ramp. There is concern that diverting traffic may degrade the operations on San Bruno Avenue.  |
|  | Long Term                   | Construct collector/distributor road between the NB US 101 to WB I-380 connector and west of the El Camino Real Interchange to separate SB US 101 traffic exiting El Camino Real.   | Separating traffic could improve weaving and congestion on I-380, but would require road widening, interchange reconstruction, an introduction of a 5 <sup>th</sup> lane which could worsen weaving west of the El Camino Interchange. Approximate \$36.4 M (2016).  |
|  | Long Term                   | Construct collector/distributor road between NB & SB US 101 and the El Camino Interchange to separate NB & SB US 101 traffic exiting to El Camino Real.   | Separating the traffic from northbound and southbound US 101 exiting to El Camino would improve weaving and congestion on I-380 between US 101 and El Camino Real. This alternative eliminates access from the airport connector on westbound I-380 to El Camino Real, and may require re-routing of local shuttle and bus services from SFO. Approximate \$31.4 M (2016). |
| Northbound I-280 between I-380 and Avalon Drive                | Short Term                  | Restripe the WB I-380 to NB I-280 connector to eliminate the inside merge between the left lane connector and the number 3 lane on NB I-280, dropping the lane on the outside.  | Eliminating the forced inside merge would improve operations on northbound I-280 and provide safety improvement for the connector. Approximate \$50K (2016).   |
|  | Long Term                   | Add auxiliary lane on NB I-280 between I-380 and Avalon Drive to eliminate the forced inside merge between the left lane on the connector and the number 3 lane on NB I-280, carry the 6th lane north to the Avalon Drive off-ramp. | Eliminating the forced inside merge would improve operations on northbound I-280 and provide a safety improvement for the connector. Adding the auxiliary lane between I-380 and Avalon Drive would improve safety and improve mainline operations during all but one PM peak period. Approximate \$3M (2016).   |
|  | Long Term                   | Construct a collector/distributor for traffic exiting to Avalon Drive from WB I-380 and NB I-280.   | Eliminating access to the Avalon off-ramp from motorists entering I-280 from the Sneath Lane on-ramp would require traffic to use alternate routes on local streets. The operations on I-280 would improve due to the elimination of weaving movements between traffic entering I-280 from I-380 and those exiting to Avalon Drive. Approximate \$67M (2016).              |
| Southbound I-280 between North Westborough Boulevard and I-380 | Short Term                  | Construct an auxiliary lane between the SB Avalon Drive on-ramp and the I-380 connector.  | Adding an auxiliary lane on I-280 SB between the Avalon Drive on-ramp and the I-380 eastbound off-ramp would improve the mainline level of service. The auxiliary lane would improve weaving and operations at the I-380 diverge in the AM peak period. Approximate \$2.7M (2016).   |
|  | Long Term                   | Construct an auxiliary lane between the SB Westborough Boulevard on-ramp and the I-380 connector.   | Adding an auxiliary lane on I-280 SB between the Westborough Boulevard on-ramp and the I-380 eastbound off-ramp would improve the mainline level of service. The auxiliary lane would improve weaving and operations at the I-380 diverge in the AM peak period. Approximate \$10.9M (2016).   |
| Southbound I-280 between I-380 and San Bruno Avenue            | Short Term                  | Restripe the WB I-380 to SB I-280 connector to eliminate the inside merge between the left lane on the connector and the number 3 lane on SB I-280, by continuing 3 lanes through the EB I-380 off-ramp.                            | Eliminating the inside merge between the I-380 on-ramp and I-280 SB mainline would improve safety, but not greatly improve operations. However the segment of I-280 would have acceptable LOS. Approximate \$700K (2016).  |
|  | Short Term                  | Install ramp metering at the existing WB I-380 to SB I-280 connector with a throughput of two vehicles per lane.  | The addition of ramp metering would improve weaving on Southbound I-280 between I-380 and the Crystal Springs Boulevard off-ramp, providing as much needed benefit at a low cost/impact. Approximate \$200K (2016).  |
| Eastbound I-380 between I-280 and El Camino Real               | Short Term                  | Restripe the NB and SB I-280 connectors to eliminate inside merge, carry four lanes along EB I-380, and realign EB off-ramp to El Camino Real.  | The alternative would eliminate the forced merge between the connectors as well as slightly improve weaving on eastbound I-380 between I-280 and El Camino Real. The additional 4 <sup>th</sup> lane along eastbound I-380 would require motorists to weave an additional lane in order to exit El Camino Real. Approximate \$1.8M (2016).                                 |
|  | Long Term                   | Construct a local exit to El Camino Real from the SB I-280 collector/distributor road and from the NB I-280 connector.  | This alternative would eliminate weaving on eastbound I-380 between I-280 and El Camino Real and improve mainline capacity. Approximate \$31.1M (2016).  |

## APPENDIX D: ADDITIONAL CORRIDOR RESOURCES

### CORRIDOR OVERVIEW

Bicycle and Pedestrian: San Mateo County Comprehensive Plan

[http://ccag.ca.gov/wp-content/uploads/2014/07/CBPP\\_Main-Report\\_\\_Sept2011\\_FINAL.pdf](http://ccag.ca.gov/wp-content/uploads/2014/07/CBPP_Main-Report__Sept2011_FINAL.pdf)

Demographics: Jobs Housing Connection Strategy, 2012

<http://www.abag.ca.gov/abag/events/agendas/e051712a-Item%204.A.2,%20Preferred%20Land%20Use%20Scenario%20-Jobs-Housing%20Connection%20Strategy.pdf>

Environmental: California's Protected Areas Database

<http://www.calands.org/>

Environmental: Naturally Occurring Asbestos

[ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ofr/ofr\\_2000-019.pdf](ftp://ftp.consrv.ca.gov/pub/dmg/pubs/ofr/ofr_2000-019.pdf)

Express Lane Network

[http://www.mtc.ca.gov/projects/express\\_lanes/pdfs/expresslanefactsheet\\_031413.pdf](http://www.mtc.ca.gov/projects/express_lanes/pdfs/expresslanefactsheet_031413.pdf)

Transit: San Mateo County Transit District (SamTrans)

<http://www.samtrans.com/>

Freight: Caltrans Ground Access to Airport Study: Executive Summary (2001)

<http://www.dot.ca.gov/hq/planning/aeronaut/documents/GroundAccessStudyExecutiveSum.pdf>

Freight: ACAIS Passenger Boardings at Commercial Service Airports (2014)

[http://www.faa.gov/airports/planning\\_capacity/passenger\\_allcargo\\_stats/passenger/media/cy14-commercial-service-enplanements.pdf](http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/media/cy14-commercial-service-enplanements.pdf)

Freight: SFO 2014 Sustainability Report

<http://media.flysfo.com/media/sfo/community-environment/sfo-2014-sustainability-report.pdf>

### CORRIDOR PERFORMANCE

San Mateo County CCAG LOS and Performance Measure Monitoring Report -2013

[http://www.ccag.ca.gov/pdf/Studies/2013/2013%20CMP\\_Final%20Nov13.pdf](http://www.ccag.ca.gov/pdf/Studies/2013/2013%20CMP_Final%20Nov13.pdf)

Traffic Operations – Ramp Metering

[http://www.dot.ca.gov/hq/traffops/trafmgmt/ramp\\_meter/](http://www.dot.ca.gov/hq/traffops/trafmgmt/ramp_meter/)

### KEY CORRIDOR ISSUES

Sea Level Rise – Adapting to Rising Tides Vulnerability and Risk Assessment - BCDC/NOAA Nov 2011

<http://www.mtc.ca.gov/planning/climate/>

Highway Operations

<http://www.dot.ca.gov/dist4/highwayops/hoindex.html>

Non-Motorized Transportation Access – Office of Transit & Community Planning

<http://www.dot.ca.gov/dist4/transplanning/pedbikeprogram/pedbikeprogram.html>

### CORRIDOR CONCEPT

Regional Transportation Plan – Plan Bay Area

<http://onebayarea.org/plan-bay-area/final-plan-bay-area/final-supplementary-reports.html>

State Transportation Improvement Program – STIP

<http://www.dot.ca.gov/hq/LocalPrograms/STIP.htm>

State Highway Operation and Protection Program – SHOPP

<http://www.dot.ca.gov/hq/transprog/shopp.htm>